

## Tribe VERNONIEAE

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Vernonieae Cass., J. Phys. Chim. Hist. Nat. Arts 88: 203. 1819.  
 TYPE: *Vernonia* Schreb.

Vernoniaceae Bessey, Ann. Missouri Bot. Gard. 2: 163. 1915. TYPE: *Vernonia* Schreb.

Perennial or rarely annual **herbs, shrubs, trees**, or scandent vines. **Leaves** alternate, rarely opposite or whorled, sometimes in a basal rosette, sessile or petiolate, entire or remotely toothed, rarely lobed, usually revolute. **Inflorescences** various, heads separate or united in glomerules. **Heads** discoid, homogamous, 1-many flowered, sometimes reduced and syncephalous, florets normally bisexual and fertile; involucre usually campanulate, ovoid, or globular; phyllaries many, closely or loosely imbricated in several series, or rarely few in one series; receptacle flat or subconvex, either smooth or pitted, rarely alveolate, sometimes with palea-like bracts. **Corollas** tubular, usually regular (subligulate in *Stokesia*), tube elongate, with five narrow lobes to the limb, rarely 3-4 lobed, or somewhat bilabiate (e.g., *Elephantopus*), deep purplish-red to white or blue (rarely yellow-orange in a few Old World species), often glandular; anthers with terminal appendages, basally sagittate, the auricles obtuse, acute or rarely tailed, pollen grains echinate to echinolphate, filaments inserted high above the base; style branches semi-cylindrical, long and slender, narrowed to the acute tips, usually short-hirsute outside, rarely glabrate, stigmatic papillae on the inner surface. **Pappus** usually elongate and setose, sometimes of scales or coroniform, often in two series, the outer reduced or rarely absent. **Achenes** variable, terete to slightly flattened, often 10-ribbed or 4- or 5-angled, occasionally smooth, rarely dimorphic.

Vernonieae may be recognized by their usually alternate leaves, their slender, pubescent style branches tapering to slender tips, their involucre of similar imbricate phyllaries in graded series, and (in Peru) by their reddish-purple, or pink to whitish corollas. Vernonieae are most likely to be confused with Eupatorieae since the heads of both are homogamous and their corollas are similarly colored. The leaves of most Vernonieae, however, are alternate as opposed to those of Eupatorieae, which are mostly opposite. In Vernonieae, the stigmatic papillae of the style branches are on the inner surface, but in Eupatorieae, they are restricted to the lower half of the lateral margins.

The tribe (worldwide) has ca. 1,456 species and over 70 genera. There is little doubt that this tribe originated in the tropics, since that is its center of diversity, the area where its primitive species occur, and the region where the majority of its genera are located. The tribe Vernonieae seemingly has two centers of distribution, one in southern Brazil and the second in tropical Africa. Vernonieae are also commonly found in Southeast Asia and associated archipelagos and in the

West Indies, Central America, and North America. Carlquist (1976) argues that the tribe originated in the New World.

Chromosome numbers are known from 16 of the 70 genera of Vernoniae. On a worldwide basis, genera with  $x = 10$  predominate, with the second greatest number having  $x = 9$ . The Old World Vernoniae are dibasic with  $x = 9$ , or 10, and have polyploids derived from either base number. *Vernonia* in the New World has a base number of  $x = 17$  which is assumed to represent ancient polyploids derived by aneuploidy from a base of  $x = 9$ . Cytologically, this tribe has less known about it than any of the other Compositae tribes.

## REFERENCES

- CARLQUIST, S. 1976. Tribal interrelationships and phylogeny of the Asteraceae. *Aliso* 8, pp. 465-492.
- JONES, S. B. 1977. Vernoniae — Systematic review. In Heywood, V. H., J. B. Harborne, and B. L. Turner, *The Biology and Chemistry of the Compositae*. Vol. I, pp. 503-521. Academic Press, London.
- WAGENITZ, G. 1976. Systematics and phylogeny of the Compositae (Asteraceae). *Pl. Syst. Evol.* 125, pp. 29-46.

## KEY TO GENERA OF VERNONIEAE

- a. Heads united in glomerules, syncephalous.
  - b. Pappus of straight bristles which are all alike .....VI. *Elephantopus*.
  - bb. Pappus of bristles, at least two of which are spirally twisted or doubly bent ... VII. *Pseudelephantopus*.
- aa. Heads separate from each other, not syncephalous.
  - c. Pappus a ring or corona shorter than the achene .....V. *Struchium*.
  - cc. Pappus of strigose bristles or of scales longer than achene, often biseriate, the outer shorter.
    - d. Outer phyllaries leaflike, wide-spreading; pappus easily deciduous; inner phyllaries usually distinctly awn-tipped .....IV. *Centratherum*.
  - dd. Outer phyllaries scalelike, mostly appressed; pappus persistent; inner phyllaries acute to acuminate or mucronate.
    - e. Heads with 2 (rarely 1 or 3) florets .....III. *Pollalesta*.
  - ee. Heads with more than 3 florets.
    - f. Inflorescences terminal, composed of scorpioid cymes or becoming paniculate or corymbiform; anthers saggitate at base; pubescence not stellate-tomentose .....I. *Vernonia*.
    - ff. Inflorescences aggregated in rounded axillary corymbs or sessile in rounded axillary clusters. Anthers caudate at base; pubescence often stellate-tomentose .....II. *Piptocarpha*.

## I. VERNONIA

**Vernonia** Schreb., Gen. Pl. 2: 541. 1791. *nom. cons.* TYPE: *V. noveboracensis* (L.) Willd.

*Serratula noveboracensis* L., Sp. Pl. 818. 1753. TYPE: *S. noveboracensis* L. *typ. cons.*

*Behen* Hill, Veg. Syst. 4: 41. 1762. TYPE: *B. noveboracensis* (L.) Hill.

*Suprago* Gaertn., Fruct. 2: 402. 1791. TYPE: *S. glauca* Gaertn.

*Baccaroides* Moench, Meth. 578. 1794. TYPE: *B. anthelmintica* (L.) Moench.

*Hololepis* DC., Ann. Mus. Natl. Hist. Nat. 16: 190. 1810. TYPE: *H. pedunculata* DC.

*Teichostemma* R. Br. ex Salt, Abyss. App. 65. 1814. TYPE: *T. fruticosum* R. Br.

*Bracheilema* R. Br. ex Salt, Abyss. App. 65. 1814. TYPE: *B. paniculatum* R. Br.

*Ascaricida* Cass., Dict. Sc. Nat. 3: Suppl. 38. 1816. TYPE: *A. indica* Cass.

*Centrapalus* Cass., Dict. Sc. Nat. 7: 382. 1817. TYPE: *C. galamensis* Cass.

*Isonema* Cass., Bull. Soc. Philom. Paris 1817: 152. 1817. TYPE: *I. ovata* Cass.

*Distephanus* Cass., Bull. Soc. Philom. Paris 1817: 151. 1817. TYPE: *Conyza populifolia* Lam.

*Lepidaploa* Cass., Bull. Soc. Philom. Paris. 1817: 66. 1817. TYPE: *V. glauca* (L.) Willd.

*Gymnanthemum* Cass., Bull. Soc. Philom. Paris 1817: 10. 1817. TYPE: *G. congestum* Cass.

*Turpinia* Lex. ex LaLlave & Lex., Nov. Veg. Desc. fasc. 1: 22. 1824. TYPE: *T. tomentosa* Lex. ex LaLlave & Lex.

*Acilepsis* D. Don, Prod. Fl. Nep. 169. 1825. TYPE: *A. squarrosa* D. Don.

*Cyanthillium* Bl., Bijdr. 889. 1826. TYPE: *C. moluccense* Bl.

*Achyrocoma* Cass., Dict. Sc. Nat. 5: 57. 1828. TYPE: *A. tomentosa* Cass.

*Cyanopsis* Bl. ex DC., Prodr. 5: 69. 1836. TYPE: *C. villosa* (Bl.) DC.

*Plectreca* Raf., Fl. Tellur. 4: 119. 1836. TYPE: *P. corymbosa* (Schwein.) Raf.

*Webbia* DC., Prodr. 5: 72. 1836. TYPE: *W. pinifolia* (Less.) DC.

*Monosis* DC., Prodr. 5: 77. 1836. TYPE: *M. wightiana* DC. ex Wight.

*Keringa* Raf., Sylva Tellur. 144. 1838. TYPE: *K. amygdalina* (Delile) Raf.

*Flustula* Raf., Sylva Tellur. 116. 1838. TYPE: *F. tomentosa* Raf.

*Candidea* Ten., Atti Accad. Sci. Fis. 4: 104. 1839. TYPE: *C. senegalensis* Ten.

*Cyanopsis* Endl., Ench. 232. 1841.

*Trianthaea* Spach, Hist. Vég. Phan. 10: 39. 1841.

*Linzia* Sch. Bip., Flora 24. I. Intell. 26. 1841. TYPE: *L. glabra* (Steetz) Sch. Bip.

*Cheliusia* Sch. Bip., Flora 24. I. Intell. 26. 1841. TYPE: *C. abyssinica* Sch. Bip.

*Stengelia* Sch. Bip., Flora 24. I. Intell. 26. 1841. TYPE: *S. adoensis* Sch. Bip.

*Polydora* Fenzl, Flora 27: 312. 1844. TYPE: *P. stoechadifolia* Fenzl.

*Claotrachelus* Zoll., Natuur- Geneesk. Arch. Ned.-Indië. 2: 565. 1845. TYPE: *C. rupestris* Zoll. & Mor.

*Leiboldia* Schlecht., Linnaea 19: 742. 1847. TYPE: *L. leiboldiana* Schlecht.

*Vernonella* Sond., Linnaea 23: 62. 1850. TYPE: *V. africana* Sond.

*Llerasia* Triana., Ann. Sci. Nat. Ser. 4: 10. 1858. TYPE: *L. lindeni* Triana.



- Strobocalyx* Sch. Bip., Pollichia 28/29: 170. 1861. TYPE: *S. arborea* (Buch.-Ham.) Sch. Bip.
- Crystallopollen* Steetz ex Peters., Reise Mossamb. Bot. part 6: 363. 1862-1864. TYPE: *C. angustifolium* Steetz.
- Ambassa* Steetz ex Peters., Reise Mossamb. Bot. part 6: 346. 1862-1864. TYPE: *A. hochstetteri* (Sch. Bip. ex Hochst.) Steetz ex Peters.
- Xipholepis* Steetz ex Peters., Reise Mossamb. Bot. part 6: 344. 1862-1864. TYPE: *X. silhetensis* (DC.) Steetz.
- Punduana* Steetz ex Peters., Reise Mossamb. Bot. part 6: 345. 1862-1864. TYPE: *P. volkammeriaefolia* (DC.) Steetz ex Peters.
- Lysistemma* Steetz ex Peters., Reise Mossamb. Bot. part 6: 340. 1862-1864. TYPE: *L. indica* (Wall. ex Clarke) Steetz ex Peters.
- Stenocephalum* Sch. Bip., Pollichia 20/21: 385. 1863. TYPE: *S. monticulum* (DC.) Sch. Bip.
- Tephrothamnus* Sch. Bip., Pollichia 20/21: 431. 1863. TYPE: *T. pycnanthus* (Benth.) Sch. Bip.
- Critoniopsis* Sch. Bip., Pollichia 20/21: 430. 1863. TYPE: *C. lindenii* Sch. Bip.
- Senecioides* Post & O. Ktze., Lex. Gen. Phan. 2: 515. 1903. TYPE: *S. cinereum* (L.) Post & O. Ktze.
- Eremosis* (DC.) Gleason, Bull. New York Bot. Gard. 4: 227. 1906. TYPE: *E. salicifolia* (DC.) Gleason.

Perennial **herbs, shrubs**, or small **trees**, scandent **lianas**, or rarely annuals. **Leaves** alternate, simple, pinnately veined, usually cauline, or sometimes basal in herbaceous perennials; blades various, lanceolate to ovate or elliptic. **Inflorescences** terminal or upper axillary or scorpioid cymes, panicles, corymbs, or combinations thereof, or reduced to solitary terminal or axillary heads. **Heads** discoid, homogamous, with 1-many florets; involucre cylindric to broadly hemispheric or campanulate; phyllaries loosely or closely imbricate in several series, the inner phyllaries progressively longer; receptacle flat to subconvex. **Corollas** tubular, regular, 5-lobed, deep reddish purple to whitish or pinkish (blue and yellow in the Old World); often slightly glandular; anthers sagittate at the base; style branches elongate, filiform-subulate, outer surface hispid throughout, with stigmatic pappillae on inner surfaces. **Pappus** usually in 2 series, the inner pappus of capillary, terete, or slightly flattened, purple to white bristles; the outer series short, of bristles or scales, or pappus bristles subequal and not in distinct series. **Achenes** ribbed or sometimes ribless, commonly resinous-dotted between the ribs. Chromosome number:  $x = 17$  in New World.

#### KEY TO SPECIES OF *Vernonia*<sup>5</sup>

- a. Heads with 7 or fewer florets.
- b. Inner pappus bristles ca. 3.5 mm long; corollas ca. 3 mm long.....  
1. *V. pycnantha*.

<sup>5</sup>As the present manuscript went to press, two additional *Vernonia* species were described from Peru; see Robinson, H., 1980. *Phytologia* 45(2): 158-165.—M.O.D.



- bb. Inner pappus bristles 4 mm or more long; corollas 5 mm or more long.
  - c. Leaves glabrate or with scattered small trichomes beneath; inflorescences large (2-3 dm broad and tall) with scorpioid-cymose branches ..... 21. *V. cainarachiensis*.
- cc. Leaves tomentose, softly pubescent, or with tomentum beneath; inflorescences smaller (less than 2 dm broad), branches not scorpioid.
  - d. Inner pappus bristles ca. 9 mm long; corollas ca. 8 mm long; achenes strigose ..... 2. *V. lambayequensis*.
  - dd. Inner pappus bristles ca. 6.5 mm or less long; corollas 7 mm or less long; achenes glandular to sparsely pilose.
    - e. Leaf blades 3.5-6 cm long, 1.5-2.4 cm wide, coriaceous ..... 3. *V. jalcana*.
    - ee. Leaf blades 7-20 cm long, 2.5-5.5 cm wide, not coriaceous.
      - f. Achenes sparsely pilose; inner phyllary tips obtuse; leaf blades elliptic to ovate ..... 4. *V. woytkowskii*.
      - ff. Achenes glabrous to glandular; inner phyllary tips acute; leaf blades lanceolate to long-elliptic.
        - g. Inner pappus bristles 6.5 mm long; heads with 4-5 florets; pappus white; leaf blades tomentose beneath, with scattered longer dark-brown villous trichomes arising above the tomentum ..... 5. *V. peruviana*.
        - gg. Inner pappus bristles 5 mm long; heads with 5-7 florets; pappus straw-colored; leaf blades tomentose beneath with no long villous trichomes ..... 6. *V. jelskii*.
- aa. Heads with 8 or more florets.
  - h. Heads with more than 50 florets.
    - i. Heads with 80-90 florets; corollas ca. 5.5 mm long; leaf blades rigid or coriaceous ..... 7. *V. libertadensis*.
    - ii. Heads with ca. 50 florets; corollas ca. 2.5 mm long; leaf blades thin ..... 8. *V. gracilis*.
  - hh. Heads with 36 or less florets.
    - j. Pappus straw-colored, brown or pinkish.
      - k. Inner pappus bristles ca. 10-11 mm long, corollas 12-13 mm long.
        - l. Heads with ca. 20 florets; corolla throats glandular; phyllary tips acute; inflorescences of axillary, leafy cymes ..... 9. *V. laurifolia*.
        - ll. Heads with ca. 12 florets; corolla throats glandular; phyllary tips acuminate; inflorescences paniculate-corymbose ..... 10. *V. sordidopapposa*.
  - kk. Inner pappus bristles ca. 7 mm or less long; corollas 10 mm or less long.
    - m. Corollas ca. 10 mm long; heads with 7-13 florets; inner phyllary tips obtuse; pappus pinkish ..... 21. *V. cainarachiensis*.
    - mm. Corollas ca. 8 mm long; heads with 14-26 florets; inner phyllary tips acute to long-acuminate; pappus straw-colored to brown.
      - n. Outer pappus of fimbriate scales ca. 1.2 mm long; pappus light brown; corollas ca. 8 mm long; inner phyllary tips long-acuminate ..... 11. *V. mapiensis*.

- nn. Outer pappus of bristles 0.8 mm or less long; pappus straw-colored; corollas ca. 6.5 mm or less long; inner phyllary tips acute to slightly acuminate.
- o. Leaf blades densely tomentose beneath, oblong-elliptic; achenes faintly strigose .....12. *V. ferruginea*.
  - oo. Leaf blades glabrate to hispid or downy beneath, elliptic to broadly elliptic or ovate-lanceolate; achenes glandular-hispid .....16. *V. patens*.
- jj. Pappus white.
- p. Inflorescences paniculate-corymbose or cymose.
    - q. Inner bristles of pappus ca. 6-7 mm long .....17. *V. fulva*.
    - qq. Inner bristles of pappus ca. 4.5 mm or less long.
      - r. Leaf blades 2-6 cm long, 1-2.7 cm wide.
        - s. Corollas ca. 9 mm long; leaf blades cordate to ovate or ovate-elliptic, densely white tomentose beneath; inner phyllary tips long-acuminate. ....18. *V. apurimacensis*.
        - ss. Corollas ca. 4.5-5 mm long; leaf blades lanceolate, glabrate beneath; inner phyllary tips acute to obtuse or mucronate. ....14. *V. stuebellii*.
      - rr. Leaf blades ca. 12-26 cm long, ca. 5-15 cm wide.
        - t. Heads with ca. 36 florets; leaf blades elliptic to elliptic-oblong, villous beneath .....13. *V. costata*.
        - tt. Heads with ca. 20 florets; leaf blades ovate to ovate-lanceolate, tomentose beneath .....15. *V. sambrayana*.
  - pp. Inflorescences scorpioid-cymose or somewhat scorpioid-paniculate.
    - u. Leaf blades 3.5 cm or less long.
      - v. Inner phyllary tips slightly recurved; heads with 14-24 florets. ....19. *V. scorpioides*.
    - vv. Inner phyllary tips flat or straight; heads with 11-13 florets.
      - w. Corollas ca. 5 mm long; leaf blades ca. 1.9 cm wide, closely pubescent with minute slender hairs, ovate-oblong to elliptic-ovate .....25. *V. fieldiana*.
      - ww. Corollas ca. 8 mm long; leaf blades ca. 2.5 cm wide, villous to hirsute with straw-colored trichomes; obovate to obovate-lanceolate .....27. *V. herbacea*.
  - uu. Leaf blades (4)6-70 cm long.
    - x. Inner phyllary tips slightly recurved .....19. *V. scorpioides*.
    - xx. Inner phyllary tips flat or straight.
      - y. Achenes brownish, with round glandular trichomes .....22. *V. yurimaguasensis*.
    - yy. Achenes not brownish, with hairlike trichomes.
      - z. Leaf blades minutely or sparsely pubescent beneath; inner phyllary tips acute to acuminate or fimbriate.
        - a' Achenes strigose; leaf blades 10-17 cm long, 3.5-7 cm wide .....23. *V. myriocephala*.

- aa' Achenes sparsely pubescent; leaf blades 20-70 cm long, 8-19 cm wide .....20. *V. brachiata*.
- zz. Leaf blades densely or sparsely strigose or strigose-hirsute beneath; inner phyllary tips acute, subulate or spinose.
- b' Inner pappus bristles 4 mm long; corollas pinkish to whitish; leaf blades 4-7 cm wide; inflorescences of scorpioid cymes arranged in spreading panicles or corymbs .....24. *V. canescens*.
- bb' Inner pappus 6-8 mm long; corollas reddish-purple; leaf blades 1.5-3 cm wide; inflorescences divaricately spreading scorpioid cymes .....  
26. *V. salzmannii*.

1. *Vernonia pycnantha* Benth., Pl. Hartw. 134. 1844. TYPE: in montibus Paccha (K, not seen).

*Critoniopsis lindenii* Sch. Bip., Pollichia 20/21: 431. 1863. TYPE: Colombia: Quindiu, Los Volcancitos, *Linden 1054* (Holotype P, as photo F!).

*Vernonia lindenii* (Sch. Bip.) Cuatr., Bot. Jahrb. Syst. 77: 72. 1956.

**Shrub** with long scandent branches, sometimes forming a tree, young stems brownish-tomentose to almost glabrate. **Leaves** cauline, petiolate; petiole ca. 0.8-1.5 cm long; blades ovate-elliptic, elliptic, or elliptic-lanceolate, acuminate to acute at the apex, cuneate to cuneate-rounded at the base, ca. 8-15 cm long, ca. 3.5-7 cm wide, margins revolute, and sometimes remotely toothed, largely glabrous but remotely glandular above, glabrate and glandular to tomentose beneath. **Inflorescence** of terminal, corymbose cymes with reduced bracteal leaves along main axis. **Heads** with ca. 6 florets, sessile in dense pedunculate clusters; involucre campanulate, ca. 4 mm long, loosely imbricated; phyllaries soon deciduous, glabrous to slightly pubescent, green, tipped with purple; inner phyllaries oblong, tips rounded; outer phyllaries ovate. **Corollas** ca. 3 mm long. **Pappus** white; inner bristles 3.5 mm long, outer bristles ca. 1 mm long. **Achenes** ca. 2.2 mm long, ribbed, lightly strigose.

This species is distributed from Ecuador south to Peru. In Peru, it has been collected at 1,750 m elevation within a forest border. Flowering and fruiting occur from July to September.

HUANUCO: Churubamba, *Mexia 8229* (F, MO, NY, UC).

2. *Vernonia lambayequensis* S. B. Jones, *sp. nov.* TYPE: Peru: Lambayeque: km 28 E of Olmos, *Hutchison and Wright 3473* (Holotype UC! Isotypes F! MO! USM!).

Frutex 2.5 m altus. Foliorum laminae ellipticae ad elliptico-obovatae, ca. 8-12 cm longae, ca. 4-5 cm latae. Inflorescentia terminalis, paniculato-corymbiformis, capitulis in fasciculos compactos, rotundatos, conspicue aggregatis. Capitula 5-flosculos habentia. Achenia strigosa.

Erect **shrub**, up to 2.5 m tall, young stems canescent. **Leaves** cauline; petioles ca. 0.7-1 cm long; blades elliptic to elliptic-obovate, acute to rounded or mucronate at the apex, cuneate at the base, ca. 8-12 cm long, 4-5 cm wide, margins revolute, very faintly



toothed, glabrate to slightly canescent above, veins canescent above, softly pubescent beneath. **Inflorescences** terminal, paniculate-corymbiform, heads grouped in compact, rounded clusters within the inflorescence, branches canescent. **Heads** with 5 florets, sessile; involucre cylindrical, ca. 6 mm long, 4- to 5-seriate; phyllaries canescent and dark at tips, yellowish; inner phyllaries oblong-lanceolate, tips obtuse to acute; outer phyllaries ovate, arachnoid. **Corollas** ca. 8 mm long, pale purple to almost white, glandular on tube. **Pappus** white; inner bristles ca. 9 mm long, outer bristles ca. 1 mm long. **Achenes** ca. 3.5 mm long, strigose, ribbed.

This species is known only from the type location in Depto. Lambayeque, where it was collected at 1,150 to 1,200 m elevation. Habitat information was not available on the label; however, it was described as being rare.

3. *Vernonia jalcana* Cuatrec., Ann. Missouri Bot. Gard. 52: 312. 1965. TYPE: Peru: Amazonas: Prov. Chachapoyas, Molinopampa. *Wurdack 1359* (Holotype US, Isotype UC!).

**Shrub**, 1.5-2 m tall; stems grayish to brownish-tomentose to almost black, with scattered long purple trichomes. **Leaves** crowded, coriaceous; petiolate, petioles ca. 7 mm long; blades ovate-elliptic, acute at the apex, cuneate to slightly rounded at the base, 1.5-2.4 cm long, 3.5-6 cm wide, margins entire, upper surface reticulate and tomentose on lower part of midvein, gray tomentose, with scattered long purple trichomes beneath. **Inflorescences** densely corymbose-paniculate. **Heads** with 3 florets, compact and almost sessile; involucre campanulate-cylindrical, 7-8.5 mm long, 5- to 6-seriate; phyllaries arachnoid, glandular near tips, tightly appressed, purplish; inner phyllaries oblong, tips acute; outer phyllaries lanceolate. **Corollas** ca. 6-7 mm long, reddish-purple, with scattered glands. **Pappus** white; inner bristles ca. 6.5 mm long, outer bristles ca. 1-1.5 mm long. **Achenes** 3 mm long, glandular, very faintly ribbed.

This species occurs in Depto. Amazonas in the jalca zone (north Peruvian paramo) at 2,000-3,000 m elevation. Flowering and fruiting occur in June.

AMAZONAS: Chachapoyas, Cerros Calla Calla, 19 km above Leimebama on road to Balsas, *Hutchison and Wright 5515* (F, MO, NY, USM); Bongará, 3 km S of Pomacocha, *Wurdack 971* (F, USM). CAJAMARCA: Cutervo: Cerros de Cutervo, 2,500-2,600 m, *Ferreira 0810* (USM).

4. *Vernonia woytkowskii* S. B. Jones, *sp. nov.* TYPE: Peru: Lambayeque: Porculla ad Olmos, *Woytkowski 6770* (Holotype MO! Isotype GA!).

Frutex scandens, ca. 7 m altus, caulibus dense canescentibus. Foliorum laminae ellipticae vel oblongo-ellipticae vel ovatae, ca. 7-12 cm longae, ca. 4-5 cm latae. Inflorescentia terminalis, compacta, capitulis dense conglomeratis. Capitula 5-6 flosculos habentia. Achenia sparsim pilosa.

**Liana**, ca. 7 m tall, young stems densely canescent. **Leaves** cauline; petioles canescent, ca. 1 cm long; blades elliptic, oblong-elliptic, or ovate, acute to obtuse at the apex,

cuneate at the base, 7-12 cm long, 4-5 cm wide, margins mostly entire, slightly revolute, very remotely fine-toothed, finely and remotely canescent above, softly tomentose and with raised veins beneath. **Inflorescences** terminal, very compact (actually forming a dense mass of heads) corymbose-paniculate, bracts only at very base of inflorescence. **Heads** with 5-6 florets, sessile; involucre cylindrical-campanulate, 5.5 mm long, 4- to 5-seriate; phyllaries pubescent at tips, wide spreading when mature and deciduous along with achenes; inner phyllaries oblong, tips obtuse, dark brown; outer phyllaries obtuse. **Corollas** ca. 5.5 mm long, white (from label), sparsely glandular. **Pappus** whitish; inner bristles ca. 4.5 mm long, outer bristles ca. 0.5 mm long. **Achenes** ca. 2.4 mm long, very sparsely pilose, faintly ribbed.

This species is known only from the type location in Depto. Lambayeque. It was collected on the barren slope of a hill, sprawling upon *Cereus* at an elevation of 2,100 m. It apparently flowers and fruits in August and September.

5. *Vernonia peruviana* Cuatrec., Bot. Jahrb. Syst. 77: 75. 1956. TYPE: Peru: Villcabamba, Hacienda on Rio Chinchao, *Macbride 5150* (Holotype F! as photo F! Isotype NY).

**Shrub** 3-4 m tall, with spreading branches, younger stems pubescent. **Leaves** cauline, coriaceous; petioles pubescent, 1-2.5 cm long; blades oblong-lanceolate to oblong-elliptic, acute to slightly acuminate at the apex, rounded or obtuse at the base, 10-20 cm long, 3-5.5 cm wide, margins mostly entire, but sometimes remotely toothed, slightly revolute, mostly glabrate except pubescent along midvein above, densely tomentose beneath, also having scattered dark brown, villous trichomes beneath. **Inflorescences** terminal, paniculate-corymbose. **Heads** with (4)5 florets, mostly sessile or subsessile; involucre broadly campanulate, ca. 6 mm long, 5- to 6-seriate; phyllaries arachnoid to ciliate, mostly deciduous when achenes mature; inner phyllaries oblong, tips acute; outer phyllaries ovate. **Corollas** ca. 7 mm long. **Pappus** white; inner bristles ca. 6.5 mm long, outer bristles ca. 2-4 mm long. **Achenes** ca. 3 mm long, glabrous or sparsely glandular, ribbed.

This species is known only from the type location where it was collected on a mountain slope at 2,000 m elevation. Flowering and fruiting occur in July and August.

6. *Vernonia jelskii* Hieron., Bot. Jahrb. Syst. 36: 459. 1905. TYPE: Tambillo, *Jelski 602* (Holotype B, as photo F! Isotype MO!).

*V. jelskii* Hieron. var. *virescens* Hieron., Bot. Jahrb. Syst. 36: 459. 1905. TYPE: Peru: Tambillo, *Jelski 623* (Holotype B, not seen).

**Shrub**, stems slightly brownish-tomentose. **Leaves** cauline, prominently pinnately nerved; petiolate, petioles ca. 1 cm long with brownish tomentum; blades narrowly, long-elliptic, acuminate at the apex, cuneate at the base, 12-18 cm long, 2.5-4 cm wide, margins revolute, glabrous above, reticulate veined, finely glandular, and with tomentum beneath. **Inflorescences** paniculate-corymbose, leafy. **Heads** with 5-7 florets, sessile; involucre campanulate, ca. 6 mm long, loosely imbricate, 6- to 9-seriate; phyllaries arachnoid with tomentum at base, loosely appressed, brownish-straw colored; inner

phyllaries oblong, deciduous, tips acute to slightly fimbriate; outer phyllaries lanceolate, tips acute. **Corollas** ca. 5 mm long, light reddish-purple, glandular. **Pappus** straw-colored; inner bristles 5 mm long, outer bristles 0.5-0.7 mm long. **Achenes** ca. 2.5 mm long, glandular, slightly ribbed.

This species is known only from the type location of Tambillo. Flowering and fruiting occur in August.

7. *Vernonia libertadensis* S. B. Jones, *sp. nov.* TYPE: Peru: La Libertad: Otuzco: Cerro Sango (Motil-Shorey), Lopez 1947 (Holotype GA!).

Frutex caule glanduloso. Folia rigida, laminis ca. 2.5 cm longis, ca. 0.8-1 cm latis, resinoso-glandulo-punctatis. Inflorescentia parva, terminalis, corymbosa. Capitula 80-90 flosculos habentia. Involucrum 10-11 mm longum. Setae pappi subaequales, ca. 7 mm longae.

**Shrub**, stems glandular. **Leaves** rigid, cauline, crowded, sessile; blades oblong-lanceolate, obtuse to acute at the apex, cuneate at the base, ca. 2.5 cm long, ca. 0.8-1 cm wide, margins entire, resinous, glandular-punctate both above and beneath. **Inflorescences** relatively small, terminal, corymbose-cymose, the few heads terminal on short branches, the heads subtended by bracteal leaves which are only slightly reduced from the cauline leaves. **Heads** with 80-90 florets; involucre campanulate, 10-11 mm long, ca. 6-seriate; phyllaries slightly fimbriate, resinous, tightly appressed; inner phyllaries oblong, tips obtuse to rounded or cuspidate; outer phyllaries oblong-lanceolate to ovate-lanceolate. **Corollas** ca. 5.5 mm long, reddish-purple, tube slender. **Pappus** straw-colored; bristles in one series ca. 7.5 mm long. **Achenes** ca. 2.4 mm long, ribbed, remotely strigose.

This species is known only from the type location where it was collected at the border of a field at an elevation of 3,300 to 3,400 m. Flowering and fruiting occur in June and July.

8. *Vernonia gracilis* H.B.K., Nov. Gen. & Sp. 4: 34. 1820. TYPE: Colombia: Turbaco, *Humboldt and Bonpland 1439* (Holotype P, as IDC microfiche!).

*V. moritziana* Sch. Bip., Linnaea 20: 511. 1847. TYPE: Venezuela (not seen).

*Cacalia gracilis* (H.B.K.) O. Ktze., Rev. Gen. Pl. 970. 1891.

*C. moritziana* (Sch. Bip.) O. Ktze., Rev. Gen. Pl. 970. 1891.

Annual herbs, 2-3 dm tall, stems reddish-purple, sparsely strigose. **Leaves** cauline, thin; petioles 0-5 mm long; blades lanceolate, elliptic to elliptic-lanceolate, rounded to acute at the apex, cuneate at the base, 4-5 cm long, 1-1.6 cm wide, margins remotely toothed, minutely scabrous above, glandular punctate and remotely pubescent beneath. **Inflorescences** cymose, weakly branching, bracteal leaves present and similar to the stem leaves. **Heads** with ca. 50 florets, sessile; involucre broadly campanulate, ca. 5 mm long, 3- to 4-seriate; phyllaries minutely glandular, ciliate, arachnoid, greenish; inner phyllaries oblong-lanceolate, tips acuminate; outer phyllaries ovate-lanceolate. **Corollas** pinkish, ca. 2.5 mm long. **Pappus** straw-colored, of indurate, thick bristles; inner 2.5 mm long, outer 0.3 mm long. **Achenes** ca. 2 mm long, slightly pubescent, ribbed.



This species is distributed from northern South America south into Peru. Only one collection has been seen. It was flowering in September.

LORETO: Rio Mamón near Rio Nanay, *Croat 19916* (MO, NY).

9. *Vernonia laurifolia* DC., Prodr. 5: 30. 1836. TYPE: (G-DC, as IDC microfiche!).

*Cacalia laurifolia* (DC.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

**Herb** 1 m tall, stems brownish-tomentose. **Leaves** coriaceous, cauline; petiolate, petiole 0.3-0.8 cm long; blades elliptic to lanceolate, acute at the apex, cuneate to rounded at the base, ca. 5-7.5 cm long, 2-3.5 cm wide, margins revolute, glabrous except along midvein above, glandular and prominently veined beneath. **Inflorescences** of axillary leafy cymes, heads usually arising in the internodes of the bracteal leaves. **Heads** with ca. 20 florets, long peduncled; involucre narrowly campanulate, ca. 14 mm long, tightly imbricate, 7-seriate; phyllaries slightly arachnoid at base, reddish-purple; inner series of phyllaries linear-lanceolate and much longer than the other series, tips acute; outer phyllaries lanceolate. **Corollas** ca. 13 mm long, reddish-purple, glandular on outer throat. **Pappus** light brown; inner bristles ca. 10 mm long, outer bristles ca. 2 mm long. **Achenes** (immature) brownish-pubescent.

This species has been collected in Depto. Puno at elevations of 1,900 m, growing in a moist, shady place in rocky soil. Flowering and fruiting occur from May to June.

PUNO: Carabaya: trail Santo Domingo to Chabucamine, *Metcalf 30660* (MO, UC, US).

10. *Vernonia sordidopapposa* Hieron., Bot. Jahrb. Syst. 22: 697. 1897. TYPE: Peru: Sandia, *Weberbauer 759* (Holotype B, as photo F! NY!).

*Cacalia sordidopapposa* (Hieron.) O. Ktze., Rev. Gen. Pl. 2: 971. 1891.

**Shrub** 1-2 m tall, stems strigose to long strigose-pilose. **Leaves** cauline; petioles 3-4 mm long; blades elliptic-lanceolate, acuminate at the apex, broadly cuneate at the base, 3-8 cm long, 1.5-2.5 cm wide, margins distinctly revolute, pilose-hispid and reticulate veined above, glandular and pilose-hispid to pilose beneath. **Inflorescences** paniculate-corymbose, with bracteal leaves. **Heads** with ca. 12 florets, subsessile; involucre narrowly campanulate, ca. 7 mm long, imbricate, 3- to 4-seriate; phyllaries ciliate, arachnoid to pilose-hispid, appressed, greenish-purple; inner phyllaries oblong-lanceolate, tips acuminate; outer phyllaries lanceolate. **Corollas** ca. 12 mm long, reddish-purple, glabrous. **Pappus** brown; inner bristles ca. 11 mm long, outer scales fimbriate ca. 1.5 mm long. **Achenes** ca. 2 mm long, pilose, faintly ribbed.

This species is distributed from Depto. Amazonas south to Depto. Puno at elevations of 2,400 to 3,400 m. It grows in the jalca zone and puna in moist soil. Flowering and fruiting occur from May to June.

AMAZONAS: Chachapoyas, west of Molinopampa, *Wurdack 1371* (NY, US). PUNO: Sandia, near Limbani, *Metcalf 30513* (MO).

11. *Vernonia mapirensis* Gleason, Amer. J. Bot. 10: 307. 1923. TYPE: Bolivia: Mapiri, *Buchtien 1533* (Holotype NY!).

*V. trichoclada* Gleason, Bull. Torrey Bot. Club 52: 184. 1925. TYPE: Peru: La Merced, Hacienda Schunke, *Macbride 5775* (Holotype F! as photo F! Isotype NY).

Perennial herb, erect, ca. 3.5 m tall, stems long hirsute-villous. Leaves cauline; petioles ca. 1 cm long; blades elliptic-ovate, acuminate at the apex, rounded at the base, 10-14 cm long, 5-6 cm wide, margins revolute, slightly crenate and remotely callus toothed, rugose, slightly pubescent above, hirsute-villous on midvein above, rugose and hirsute-villous beneath. Inflorescences paniculate to cymose. Heads with (10)14-20(23) florets, sessile; involucre campanulate, 8-9 mm long, imbricate, ca. 4-seriate; phyllaries ciliate, loosely appressed, greenish to reddish-purple; phyllaries long-lanceolate, tips long-acuminate. Corollas ca. 8 mm long, reddish-purple, glabrous. Pappus light brown; inner bristles ca. 7 mm long, outer scales fimbriate, ca. 1.2 mm long. Achenes 3 mm long, densely pilose.

This species occurs in Peru from Depto. Junin south to Depto. Puno at elevations of 1,300 to 2,600 m in open areas in the mountains. Flowering and fruiting occur from June to September.

JUNIN: La Merced, *Macbride 5775* (F). CUZCO: Tambopata, Machupijcho, *Vargas 13539* (US). PUNO: Sandia, 2-6 km Oconeque, *Metcalf 30603* (UC).

12. *Vernonia ferruginea* Less., Linnaea 4: 271. 1829. TYPE: Brasil: *Sellow s.n.* (not seen).

*Cacalia ferruginea* (Less.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

A small tree or shrub, 2-4 m tall, crown bushy, stems tomentose. Leaves cauline; petiolate, petioles 0.5-1 cm long; blades oblong-elliptic, obtuse at the apex, truncate to slightly rounded at the base, 8-16 cm long, 3-5 cm wide, margins remotely callus toothed, revolute, undulate to crenate, arachnoid to glabrate, tomentose on large veins above, tomentose beneath. Inflorescences paniculate-cymose with slightly scorpioid branches. Heads with 20 to 26 florets, sessile; involucre campanulate, 5-6.5 mm long, ca. 5-seriate; phyllaries arachnoid-tomentose, appressed, greenish with lighter green margins; inner phyllaries ovate-lanceolate, tips acute to slightly acuminate; outer phyllaries oblong-lanceolate. Corollas 4.5-5 mm long, reddish-purple, sometimes slightly glandular. Pappus straw-colored; inner bristles 3.5-4 mm long, outer bristles ca. 0.7 mm long. Achenes ca. 1.8 mm long, faintly strigose, weakly ribbed.

This species is distributed from Depto. Junin south to Depto. Cuzco into Brazil at elevations of 800 to 1,000 m on open hillsides and grassy slopes. Flowering and fruiting occur from June to August.

JUNIN: San Ramón, *Killip and Smith 24780* (F, NY, US). CUZCO: Convencion, Chahuare, *Vargas 21674* (US).

13. *Vernonia costata* Rusby, Mem. Torrey Bot. Club 6: 53. 1896. TYPE; Bolivia: Mapiri, *Rusby 1472* (not seen).

Slender, erect **shrub**, 1-2 m tall, stems brownish-tomentose to villous. **Leaves** cauline; petioles brownish-villous, 1-1.5 cm long; blades elliptic to elliptic-oblong, acute to acuminate at the apex, cuneate to slightly rounded at the base, 12-26 cm long, 5-15 cm broad, margins revolute, sometimes with callous teeth, villous wide, densely brownish-villous and prominently veined beneath. **Inflorescences** cymose-paniculate. **Heads** with ca. 36 florets, sessile; involucre campanulate, 7-8 mm long, 6- to 7-seriate; phyllaries slightly arachnoid, tightly appressed, greenish to reddish-purple; inner phyllaries long-lanceolate, tips subacute; outer phyllaries lanceolate. **Corollas** ca. 5 mm long; reddish-purple, glandular and hairy on outside of lobes. **Pappus** white; inner bristles ca. 4.5 mm long, outer bristles ca. 0.8 mm long. **Achenes** 2-3 mm long, strigose.

This species is distributed from Depto. Junin to Depto. Cuzco south into Bolivia at elevations of 600 to 1,300 m, growing in thickets and thin woods. Flowering and fruiting occur from June to August.

JUNIN: Colonia Perene, *Killip and Smith 25012* (F, NY, US). CUZCO: Convencion, Cuesta de Ichiquiato, *Vargas 14495* (US).

14. *Vernonia stuebelii* Hieron., Bot. Jahrb. Syst. 21: 327. 1895. TYPE: Peru: San Martín: Cerro de la Campana between Moyobamba and Rio Huallaga, *Stübel 58b* (Holotype B, as photo F! USM).

Perennial **herb** or suffrutescent, stems striate, puberulent to glabrate. **Leaves** cauline; petioles short to indistinct; blades lanceolate, acute or short acuminate at the apex, cuneate at the base, ca. 5-6 cm long, ca. 1.4-1.6 cm wide, margins remotely toothed, slightly scabrous and subrugose above, glabrate beneath. **Inflorescences** corymbose-paniculate, heads numerous. **Heads** with 11-16 florets; involucre campanulate, 5- to 6-seriate; phyllaries slightly pubescent to glabrate, minutely ciliate at tips, purplish; inner phyllaries lanceolate, tips acute to obtuse or mucronate; outer phyllaries ovate. **Corollas** 4.5-5 mm long. **Pappus** white; inner bristles ca. 4 mm long, outer pappus almost scalelike, ca. 0.3 mm long. **Achenes** (immature) pubescent, turbinate.

*Vernonia stuebelii* is known only from the type collection from Cerro de la Campana, a remote area of Peru. Its habitat is not known. Flowering and fruiting occur in July and August.

15. *Vernonia sambrayana* S. B. Jones, *sp. nov.* TYPE: Peru: Cuzco: La Convencion: upper valley of Rio Sambray; western affluent of Vilcanota, open woods along trail, 1,600 m elevation, *Mexia 8055a* (Holotype UC!).

Arbor ca. 7 m alta. Foliorum laminae ovatae vel ovato-lanceolatae, longo-acuminatae, rotundatae vel rotundato-cuneatae versus basim, 12-15 cm longae, 5-6 cm latae. Inflorescentia terminalis, obovata. Capitula ca. 20 flosculos habentia. Achenia remote strigosa.

Small tree ca. 7 m tall, young stems brownish-tomentose, older stems becoming glabrate. **Leaves** cauline; petioles canescent, ca. 1.5 cm long; blades ovate to ovate-



lanceolate, long acuminate at the apex, rounded to rounded-cuneate at the base, 12-15 cm long, 5-6 cm wide, margins entire, revolute, faintly glandular-punctate and lightly pubescent above, softly tomentose and with brownish, elevated veins beneath. Inflorescences terminal, obovate, paniculate-corymbiform with branching of a scorpioid-cymose nature, a few foliaceous bracts are present in the inflorescence. Heads with ca. 20 florets, sessile to nearly sessile; involucre broadly campanulate, ca. 3.2 mm long, 4-seriate; phyllaries slightly arachnoid; inner phyllaries ovate to ovate-oblong, tips obtuse to acute; outer phyllaries ovate. Corollas ca. 3 mm long, reddish-purple, faintly glandular. Pappus whitish; inner bristles ca. 2.2 mm long, outer bristles ca. 0.1 mm long. Achenes ca. 1.7 mm long, faintly glandular, especially at base, very remotely strigose.

This species is known only from the type location in Depto. Cuzco. It apparently flowers and fruits in May and June.

16. *Vernonia patens* H.B.K., Nov. Gen. & Sp. 4: 41. 1820. TYPE: *Humboldt and Bonpland s.n.* (Holotype P, as IDC microfiche!).

*V. baccharoides* H.B.K., Nov. Gen. & Sp. 4: 40. 1820. TYPE: Colombia: Andium Novo-Granatensium juxta Gonzanama et Salto del Fraile, *Humboldt and Bonpland 3438* (Holotype P, as IDC microfiche!).

*V. suaveolens* H.B.K., Nov. Gen. & Sp. 4: 38. 1820. TYPE: Novo-Granatensi, *Humboldt s.n.* (Holotype P, as photo F! Isotype B, as photo F!).

*V. floribunda* H.B.K., Nov. Gen. & Sp. 4: 38. 1820. TYPE: Peru: *Humboldt and Bonpland s.n.* (Holotype P, as photo F! as IDC microfiche!).

*V. micradenia* DC., Prodr. 5: 38. 1836. TYPE: *Poeppig 1215* (Holotype G-DC, as photo NY!).

*V. lanceolaris* DC., Prodr. 5: 37. 1836. TYPE: México: *Haenke s.n.* (Holotype G-DC, as microfiche!).

*V. haenkeana* DC., Prodr. 5: 37. 1836. TYPE: Peru: *Haenke 8122*. (Holotype G-DC, as microfiche! as photo F! NY!).

*V. pacchensis* Benth., Pl. Hartw. 134. 1844. TYPE: montibus Paccha, *Hartweg s.n.* (Holotype K).

*V. aschenborniana* Schauer, Linnaea 19: 714. 1847.

*Cacalia lanceolaris* (DC.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

*C. patens* (H.B.K.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

*C. baccharoides* (H.B.K.) O. Ktze., Rev. Gen. Pl. 2: 969. 1891.

*C. suaveolens* (H.B.K.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

*C. aschenborniana* (Schauer) O. Ktze., Rev. Gen. Pl. 2: 969. 1891.

*C. haenkeana* (DC.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

*Vernonia bangii* Rusby, Mem. Torrey Bot. Club 6: 52. 1896. TYPE: Bolivia: between Mapiiri and Tipuani, *Bang 1483* (Holotype NY).

*V. pacchensis* Benth. var. *tambillensis* Hieron., Bot. Jahrb. Syst. 36: 460. 1905. TYPE: Peru: Tambillo, *Jelski 699* (Holotype B, as photo F! NY!).

*V. monsonensis* Hieron., Bot. Jahrb. Syst. 40: 335. 1908. TYPE: Peru: *Weberbauer 3489* (Holotype B, as photo F!).

*V. weberbaueri* Hieron., Bot. Jahrb. Syst. 40: 354. 1908. TYPE: Peru: *Weberbauer 5023* (Holotype B, as photo F!).

*V. salamana* Gleason, Bull. Torrey Bot. Club 46: 242. 1919. TYPE: Guatemala: Salamá, *Maxon and Hay 3385* (Holotype NY).

Large shrubs or small branched trees, 1.5-7 m tall, stems glabrate to lanate or tomentose, younger stems sometimes brownish-lanate. Leaves cauline, slightly coriaceous; petiole 0.7-3 cm long; blades elliptic to broadly elliptic or ovate-lanceolate, acuminate to acute at the apex, attenuate or rounded or truncate at the base, 12-22 cm long (2)3-6(10) cm wide, margins revolute, remotely callus-toothed to serrate, shiny when fresh, surface variable, glabrate to glandular-scabrous above, almost glabrate to hispid or downy, rarely brownish-tomentose beneath. Inflorescences in terminal, much branched panicles or corymbs, the branches sometimes slightly scorpioid. Heads with 14-24 florets, sessile; involucre campanulate, 3.5-5.5 mm long, loosely imbricate, 3- to 6-seriate; phyllaries arachnoid to ciliate, glandular, greenish to reddish-purple; inner phyllaries oblong-ovate to ovate-lanceolate, tips acute; outer phyllaries ovate, tips acute to apiculate. Corollas ca. 5-6.5 mm long, whitish to pinkish, glabrous, sweet-scented. Pappus straw-colored; inner bristles 4-4.8(6) mm long, outer bristles 0.3-0.8 mm long. Achenes 1.5-2 mm long, glandular, hispid, ribbed. Chromosome number:  $n = 17$ .

This species is distributed from Mexico into South America at altitudes of 100 to 2,300 m. In Peru it occurs from Deptos. Amazonas and Loreto south to Cuzco. It is very common in old clearings, along roadsides, and various open places in forests where it is an important part of secondary tropical communities. Flowering and fruiting occur from May to October. Minor variations are common within this wide ranging species; however, it is not possible to separate morphologically the Central and South American material into *V. patens* and *V. bacharoides*.

LORETO: Boqueron Padre Abad, *Woytkowski 34350* (F, MO, UC). AMAZONAS: Chachapoyas: Rio Utcubamba, *Hutchison and Wright 5854* (F, MO, UC, US, USM). CAJAMARCA: Celendin: Canyon of Rio Marañon above Balsas, *Hutchison and Wright 5399* (F, MO, UC, USM). PIURA: Ayabaca: road to Ayabaca, 18 km above Puente Tandopa, *Hutchison and Wright 6690* (F, UC, US, USM). SAN MARTÍN: San Martín: 1-4 km NE Tarapoto, *Belshaw 3252* (F, UC, US). HUANUCO: Tingo Maria, *Ferreya 879* (F, UC, US). PASCO: between Oxapampa and LaMerced, *R.P.s.n.* (USM). JUNIN: Chanchamayo Valley, *Schunke 1586* (F). AYACUCHO: LaMar: between Ayna and Hacienda Luisiana, *Dudley 11764* (USM). CUZCO: Machupicchu, *Vargas 4557* (F). MADRE DE DIOS: Iberia, *Seibert 2126* (F).

17. *Vernonia fulva* Griseb., Goett. Abh. 24: 164. 1879. TYPE: not seen.

*V. trixioides* Rusby, Mem. Torrey Bot. Club 6: 54. 1896. TYPE: Bolivia: Mapiri, *Rusby 1484* (Holotype NY, Isotype MO!).

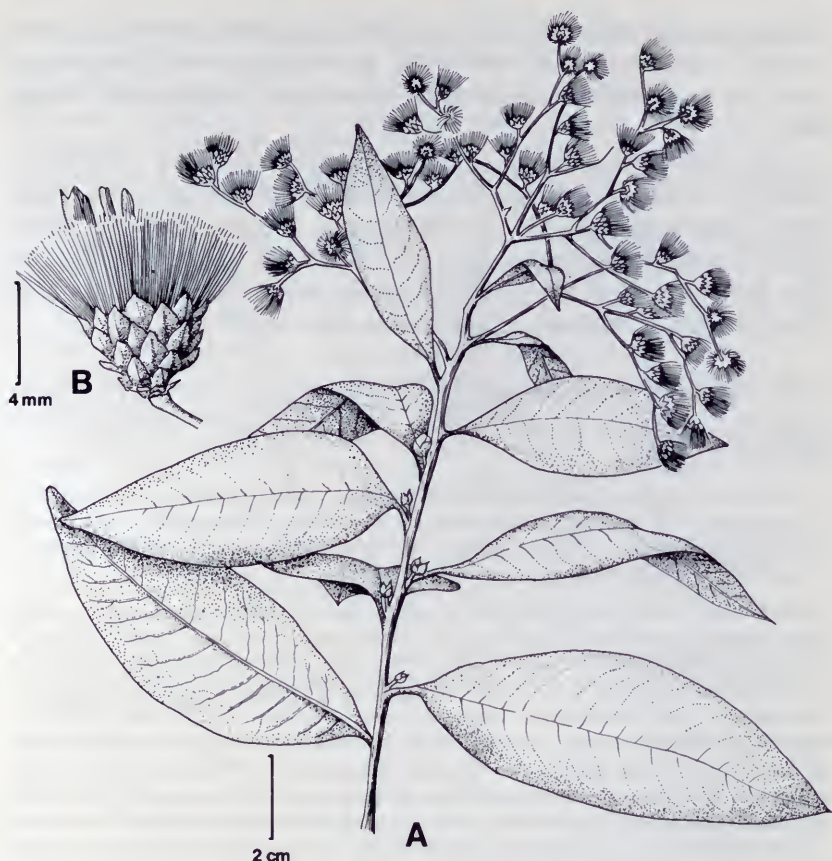


FIG. 1. *Vernonia patens*. A, habit; B, head. (From *Belshaw 3284*, F.)

*V. cotaniensis* Hieron., Bot. Jahrb. Syst. 40: 352. 1908. TYPE: Peru: PUNO: Cotani, *Weberbauer 1290* (Holotype B, as photo F! NY! USM!).

Liana 2-4 m, sprawling over other vegetation, stems tomentose to glabrate. Leaves cauline; petioles glabrate to tomentose, 1-2 cm long; blades elliptic, acute to acuminate at the apex, cuneate at the base, 7-18 cm long, 3.5-7 cm wide, margins very remotely callus toothed and slightly revolute, glabrous to glabrate or scabrous above, punctate, and sometimes pilose-hispid beneath. Inflorescences panicle-cymose. Heads with 22-36 florets, stalked; involucre campanulate, 8-11 mm long, 5-seriate; phyllaries arachnoid, loosely appressed, brownish-green with a lighter margin; inner phyllaries oblong-lanceolate, tips acute to slightly apiculate; outer phyllaries lanceolate. Corollas 10 mm long, light reddish-purple, glandular on the lobes. Pappus whitish; inner bristles 7 mm long, outer bristles 0.8 mm long. Achenes 1.8 mm long, strigose, faintly ribbed. Chromosome number:  $n = 17$ .



This species is distributed from Depto. Amazonas in Peru south to Bolivia at elevations of 1,450 to 1,800 m. Flowering and fruiting occur from July to September. In the field, it is a very attractive and striking plant.

AMAZONAS: Cascadas de Mayasi, Bagua, *Wurdack 1830* (US). LORETO: Coronel Portillo: Boquerón del Padre Abad, entre Tingo Maria y Pucallpa, 400-500 m, *Ridoutt s.n.* (USM). SAN MARTÍN: Jepelacio near Moyobamba, *Klug 3734* (MO, NY, US). PASCO: Villa Rica, *Soukup 4378* (US). JUNIN: Chanchamayo Valley, *Schunke 1786* (F). CUZCO: Amaytamta, Convencion, *Marin 1602* (F).

18. *Vernonia apurimacensis* S. B. Jones, *sp. nov.* TYPE: Peru: Apurimac: 84 miles E of Abancay, *Hutchison 1748* (Holotype UC! Isotypes F! NY!).

Frutex 1 m altus, caulibus albedo-canescens. Foliorum laminae ca. 2-3.5 cm longae, ca. 1-2.7 cm latae, subtus dense albotomentosae. Inflorescentia composita ex cymis compactis, reductis. Capitula 18 flosculos habentia. Phyllariorum interiorum apices longoacuminati. Achenia pubescentia.

Shrub up to 1 m tall, stems whitish, canescent. Leaves relatively small, cauline, sometimes crowded; petiolate to almost sessile, petioles to 0.5 cm long; blades cordate to ovate or ovate-elliptic, acute to mucronate at the apex, cordate to rounded or cuneate at the base, 2-3.5 cm long, 1-2.7 cm wide, margins revolute, remotely toothed, rugose and scabrous above and pubescent on large veins above, densely white tomentose beneath. Inflorescences usually of compact reduced cymes, but sometimes with elongated cymes, small bracteal leaves present at base of cymes. Heads with ca. 18 florets, sessile or short peduncled; involucre campanulate, 8-9 mm long, imbricated, 5-seriate; phyllaries wide-spreading when achenes are mature, arachnoid; inner phyllaries oblong-lanceolate, tips long-acuminate; outer phyllaries ovate-lanceolate. Corollas ca. 9 mm long, reddish-purple. Pappus whitish; inner bristles ca. 4.5 mm long, outer bristles ca. 1 mm long. Achenes ca. 1.5 mm long, pubescent.

This species occurs in Depto. Apurimac and Depto. Cuzco at elevations of 2,200 to 2,700 m in open shrubland. Flowering and fruiting occur from November to February.

APURIMAC: Andahuaylas: Pincos, *Stork and Horton 10668* (F, UC); Rio Pinkos, *Weberbauer 5859* (F). CUZCO: Anta: quebrada de Sisal, hasta el puente de Cunyac, hoyo del Apurimac, hacia Cuzco, *Vargas 412* (F). Puente Cunyac, *Ferreya 2744* (USM).

19. *Vernonia scorpioides* (Lam.) Pers., *Syn. Pl.* 2: 404. 1807.

*Conyza scorpioides* Lam., *Encycl. Méth.* 2: 88. 1783-1817. TYPE: Brasil: *Commerson s.n.* (Holotype: P-JU, as IDC microfiche P-JU!).

*Vernonia subrepanda* Pers., *Syn. Pl.* 2: 404. 1807. TYPE: based upon *C. scorpioides* Lam.

- V. tournefortioides* H.B.K., Nov. Gen. & Sp. 4: 34-35. 1818. TYPE: Venezuela: Caracas, *Humboldt s.n.* (Holotype: B, as photo B!).
- Lepidaploa scorpioides* (Lam.) Cass., Dict. Sc. Nat. 2: 16. 1823.
- Staelina solidaginoides* Willd. ex Less., Linnaea 4: 281-282. 1829. TYPE: based upon *V. tournefortioides* H.B.K.
- Vernonia flavescens* Less., Linnaea 6: 657. 1831. TYPE: based upon *C. scorpioides* Lam.
- V. scorpioides* (Lam.) Pers. *αcentriflora* DC., Prodr. 5: 42. 1836. TYPE: Brasil: Bahia, April 1831, *d'Hostky s.n.* (Holotype: G-DC, as IDC microfiche G-DC!).
- V. scorpioides* (Lam.) Pers. *βsubrepanda* DC., Prodr. 5: 42. 1836. TYPE: P, not seen.
- V. scorpioides* (Lam.) Pers. *γsubtomentosa* DC., Prodr. 5: 42. 1836. TYPE: Brasil: 1834, *Lund 479* (Holotype: G-DC, as IDC microfiche, G-DC!).
- V. scorpioides* (Lam.) Pers. *δlongifolia* DC., Prodr. 5: 42. 1836. TYPE: Brasil: Bahia 1830, *Salzmann s.n.* (Holotype: G-DC, as IDC microfiche G-DC!).
- V. scorpioides* (Lam.) Pers. *εlongeracemosa* DC., Prodr. 5: 42. 1836. TYPE: Brasil: 1832, *Poeppig 33 (1203)* (Holotype: G-DC, as IDC microfiche G-DC!).
- V. longeracemosa* Mart. ex DC., Prodr. 5: 42. 1836. TYPE: not seen.
- V. languinosa* Gardn., J. Bot. 5: 219. 1846. TYPE: Brasil: Minas Geras Prov.: In fruticetis prope Formigas in Sertao, *Gardner 4764* (Holotype: BM! Isotype: NY!).
- Cacalia tournefortioides* (H.B.K.) O. Ktze., Rev. Gen. Pl. 2: 971. 1891.
- C. scorpioides* (Lam.) O. Ktze., Rev. Gen. Pl. 2: 971. 1891.
- V. saepium* Ekman., Ark. Bot. 17: 63. 1929. TYPE: Haiti: Depart du Sud: Morne de la Hotte ad Ma Blanche, prope Dayette, 7 Aug. 1917, *Ekman 463* (Holotype: S! Isotypes: F! GH! NY! S! US!).

Perennial herb to almost shrublike, upright or often scandent and sprawling over other vegetation, stems densely pubescent, strigose to villous, ribbed when dry. Leaves numerous, but not crowded along stem; petioles densely pubescent, 4-7(10) mm long; blades ovate to elliptic, obtuse to acute or acuminate at the apex, cuneate and tapering at the base, (1.8)3.3-15 cm long, (1.2)2.2-8 cm wide, margins entire to rarely denticulate, strigose to pilose-hispid above, hispid to hirsute below. Inflorescences of scorpioid cymes, heads very close together. Heads with 14 to 22 florets, sessile to 1 mm peduncles; involucre campanulate, 3.5-4.5(6) mm long; phyllaries ciliate, pubescent, firmly appressed, often purple tinged; inner phyllaries linear-lanceolate with curled tips, 3.8-4.5 mm long; outer phyllaries lanceolate, 2 mm long. Corollas 6-7(8) mm long, reddish-purple, lobes ciliate. Pappus white; inner bristles 4.5-6 mm long, outer scales fimbriate, (0.8)1-1.6 mm long. Achenes 1.5 mm long, with sparse, stiff hairs between ribs. Chromosome number:  $n = 17$ .

This species is distributed from Central America and the West Indies southward into Argentina. In Peru it occurs in the selva east of the Andes. *Vernonia scorpioides* is a widely distributed species, rather weedy, and commonly occurs on disturbed sites. Flowering and fruiting occur throughout the year.

LORETO: Prov. Coronel Portillo, *Ferreya 18029* (MO). LA LIBERTAD: Otuzco: Huaranchal, Otuzco, *Miranda 1334* (USM). AMAZONAS: Prov. Bongara, *Hutchison and Wright 6829* (F, MO,



FIG. 2. *Vernonia scorpioides*. A, habit; B, head. (From Hutchison & Wright 3848, F.)



UC, US). CAJAMARCA: Prov. Hualgayoc, Monte Seco, *Soukup* 3821 (US). SAN MARTÍN: Jepelacio, near Moyobamba, *Klug* 3297 (F, MO, NY, US). HUANUCO: Prov. Huanuco, Tingo Maria, *Asplund* 12962 (US). PASCO: Tarma: San Luis de Shuaro, *Ferreyra* 18608 (USM). AYACUCHO: La Mar: between Ayna and Hacienda Luisiana, *Dudley* 11661 (USM). JUNIN: Pichis Trail, Eneñas, *Killip and Smith* 25782 (F, US). CUZCO: Macchu-Picchu, *Ferreyra* 2700 (MO, US).

20. *Vernonia brachiata* Benth. ex Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1852: 67. 1852. TYPE: *Oersted s.n.* (K).

*Cacalia brachiata* (Benth.) O. Ktze., Rev. Gen. Pl. 2: 969. 1891.

*Vernonia megaphylla* Hieron., Verh. Bot. Vereins Prov. Brandenburg 48: 195. 1906.

TYPE: Peru: Loreto: Pongo de Cainarachi, *Ule* 6386 (B, as photo F! NY!).

*V. digitata* Rusby, Bull. New York Bot. Gard. 8: 125. 1912. TYPE: Bolivia: Mapiri, *Williams* 713 (NY, not seen).

Coarse suffrutescent, perennial herb, 1.5-6 m tall, stems glabrate to lanate. Leaves cauline on current season's growth; petiole ca. 1 cm long; blades elliptic, coriaceous, acuminate at the apex, cuneate to auriculate at the base, 20-70 cm long, 8-19 cm wide, margins entire to remotely toothed, glabrous above, remotely glandular to sparsely pubescent beneath. Inflorescences terminal, large, branches of scorpioid cymes with numerous, relatively small heads. Heads with 24-34 florets, sessile in 1 or 2 rows along branches of inflorescence; involucre campanulate, 3-6 mm long, loosely imbricate, 4- to 5-seriate; phyllaries lanate-glandular, loosely appressed, reddish-purple; inner phyllaries long-lanceolate, tips acuminate; outer phyllaries ovate-lanceolate. Corollas ca. 6.5 mm long, reddish-purple, lobes glandular. Pappus white; inner bristles ca. 5 mm long, outer bristles ca. 0.7 mm long. Achenes ca. 2.8 mm long, sparsely pubescent, ribbed. Chromosome number:  $n = ca. 17$ .

It is found from Costa Rica and Panama southward into Peru. This species is distributed in Peru from Depto. Amazonas south to Depto. Cuzco in the selva. It occurs at the edge of woods, along streams, and in tropical woodlands at elevations of 135 to 1,000 m. Flowering and fruiting occur from June to November.

AMAZONAS: Bagua, Aramango, *Sagástegui s.n.* (GA). SAN MARTÍN: Lamas, *Belshaw* 3423 (F, MO). HUANUCO: Tingo Maria, *Ferreyra* 10293 (MO). LORETO: Previsto, *Woytkowski* 7585 (US). JUNIN: Tarma: Puente Perené, *Ferreyra* 11349 (USM). CUZCO: Inambari, *Vargas* 16514 (US).

21. *Vernonia cainarachiensis* Hieron., Verh. Bot. Vereins Prov. Brandenburg 48: 196. 1906. TYPE: Peru: Loreto: Pongo de Cainarachi, *Ule* 6387 (Holotype B, as photo F! Isotype F!).

Herbaceous to suffrutescent shrub, 2.5-5 m tall, often sprawling over other vegetation, stems brownish, pilose-hispid to glabrate. Leaves cauline; petioles (0)1.5-3.5(4) cm long; blades elliptic-obovate, long-acuminate at the apex, cuneate at the base, 14-40 cm long,



FIG. 3. *Vernonia brachiata*. A, habit; B, head; C, achene. (From Liesner 221, MO.)

5-14 cm wide, margins slightly revolute, very remotely callus toothed, glabrous above, almost glabrate or with small closely appressed hairs and strigose on veins beneath. **Inflorescences** terminal, paniculate-scorpoid-cymose. **Heads** with 7-13 florets, sessile; involucre campanulate, 5.5-6.9 mm long, ca. 4-seriate; phyllaries ciliate to arachnoid, and sometimes finely strigose, appressed, reddish-purple; inner phyllaries oblong, tips obtuse; outer phyllaries oblong and obtuse. **Corollas** 10 mm long, reddish-purple, glandular. **Pappus** whitish to pinkish; inner bristles ca. 6 mm long, outer bristles ca. 1 mm long. **Achenes** ca. 3 mm long, short pilose, ribbed. Chromosome number:  $n = 17$ .

This species is distributed in Peru from Depto. Loreto south to Depto. Cuzco at 400 to 1,600 m elevation in open forest or brushland. Flowering and fruiting occur from July to October.

AMAZONAS: Huampami, *Kayap 1413* (MO). LORETO: Coronel Portillo, *Ferreyra 18048* (MO). SAN MARTÍN: Puerto Pizana, Rio Huallaga, *Schunke 6453* (MO). HUANUCO: Tingo Maria, *Ferreyra 2281* (US). JUNIN: San Ramón, *Schunke A-1* (F, NY, US). CUZCO: Paucartambo, *Marin 1716* (F).

22. *Vernonia yurimaguasensis* Hieron., Verh. Bot. Vereins Prov. Brandenburg 48: 195. 1907. TYPE: Peru: Loreto: Yurimaguas, *Ule 6270* (Holotype B, as photo F! Isotype F!).

*V. vargasii* Cuatrec., Bot. Jahrb. Syst. 77: 83. 1956. TYPE: Peru: Cuzco: Urubamba, Machupicchu, *Vargas 6236* (Holotype F!).

Scandent shrub, stems grayish-brown, velutinous. **Leaves** cauline; petiole up to 1 cm long; blades broadly elliptic, acute to acuminate at the apex, cuneate at the base, 11-16 cm long, 4-8 cm wide, margins slightly revolute, sparsely pubescent to glabrate above, sparsely pubescent and glandular-punctate beneath. **Inflorescences** terminal, scorpioid cymes, branches divaricate. **Heads** with ca. 20 florets; involucre campanulate, ca. 5 mm long; phyllaries pubescent, loosely imbricated, grayish; inner phyllaries oblong, tips acute; outer phyllaries ovate. **Corollas** ca. 4 mm long, violet. **Pappus** whitish; inner bristles ca. 4 mm long, outer bristles ca. 0.6 mm long. **Achenes** ca. 2.2 mm long, glandular, brownish.

This species occurs in Deptos. Loreto, Amazonas and Cuzco in the tropical selva. Flowering and fruiting occur from May to August.

AMAZONAS: Bagua, *Sagastegui, Lopez and Collantes 4248* (GA). LORETO: as type. CUZCO: Urubamba: Machupicchu, *Vargas 6236* (F).

23. *Vernonia myriocephala* DC., Prodr. 5: 40. 1836. TYPE: Peru: *Haenke s.n.* (Holotype G-DC, as IDC microfiche! Isotype F! NY!).

*Cacalia myriocephala* (DC.) O. Ktze, Rev. Gen. Pl. 2: 970. 1891.

Shrub, 1.5-6 m tall, branches erect, stems strigose to glabrate. **Leaves** cauline, firm; petioles 0.2-1.3 cm long; blades elliptic to ovate or lanceolate, acuminate at the apex, cuneate and slightly decurrent at the base, 10-17 cm long, 3.5-7 cm wide, margins revolute (sometimes only slightly so) and remotely toothed, sometimes sparsely glandular or



faintly scabrous, glabrate, pubescent on large veins above, glandular and minutely pubescent (best viewed by turning leaf at oblique angle) beneath. **Inflorescences** scorpioid with a few very small bracteal leaves scattered in the inflorescence. **Heads** with 17-22 florets, sessile to short-stalked; involucre campanulate, (6)6.5-6.8(8) mm long, imbricate, ca. 5-seriate; phyllaries arachnoid, and sometimes minutely strigose, somewhat loosely arranged, reddish-purple to greenish; inner phyllaries oblong-lanceolate, tips acute rarely acute-acuminate or fimbriate; outer phyllaries tips acuminate to long-acuminate. **Corollas** ca. 7 mm long, reddish-purple fading to whitish, glabrous. **Pappus** white; inner bristles ca. 6 mm long, outer scales ca 1.1 mm long. **Achenes** ca. 2.5 mm long, strigose, ribbed.

This species is distributed from Depto. San Martín south to Depto. Cuzco at an elevation of 200 to 1,000 m. It occurs in tropical forests, sunny clearings, and brushlands. *Vernonia myriocephala* appears closely related to *V. canescens*, differing in amount of pubescence on the lower surfaces of the leaves. The former has leaf blades minutely or sparsely pubescent beneath, whereas *V. canescens* is densely to sparsely strigose to strigose hirsute beneath. Flowering and fruiting occur from June to August.

LORETO: Alto Amazonas: Yurimaguas, *Ferreyra* 4979 (USM). SAN MARTÍN: Mishquiyacu, *Ferreyra* 4622 (MO, USM). HUANUCO: Tulumayo near Tingo Maria, *Ferreyra* 2168 (US, USM). JUNIN: Satipo, *Ridoutt* 11718 (MO, USM). CUZCO: Quispicanchis, *Vargas* 16495 (F).

24. *Vernonia canescens* H.B.K., Nov. Gen. & Sp. 4: 35, tab. 317. 1820. TYPE: Peru: Guancabamba, *Bonpland* 3529 (Holotype P, as IDC microfiche! as photo F!).

*V. mollis* H.B.K., Nov. Gen. & Sp. 4: 36. 1820. TYPE: (Holotype P, as IDC microfiche!).

*Lepidaploa canescens* (H.B.K.) Cass., Dict. Sc. Nat. 26: 18. 1823.

*Vernonia bullata* Benth. ex Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1852: 67. 1852. TYPE: Costa Rica: Cartago, *Bjergene s.n.* (K).

*V. arborescens* Sw. var. *cuneifolia* Britt., Bull. Torrey Bot. Club 18: 311. 1891. TYPE: Bolivia: Reis, *Rusby* 2148 (Holotype NY!).

*Cacalia canescens* (H.B.K.) O. Ktze., Rev. Gen. Pl. 2: 969. 1891.

*C. mollis* (H.B.K.) O. Ktze., Rev. Gen. Pl. 2: 970. 1891.

*C. bullata* (Benth. ex Oerst.) O. Ktze., Rev. Gen. Pl. 2: 969. 1891.

*Vernonia volubilis* Hieron., Bot. Jahrb. Syst. 36: 460. 1905. TYPE: Peru, Tambillo, *Jelskii* 775 (Holotype B, as photo NY!).

*V. patuliflora* Rusby, Bull. New York Bot. Gard. 4: 376. 1907. TYPE: Bolivia: Coroico, Yungas, *Bang* 2396 (Holotype NY! Isotype NY!).

*V. cuneifolia* (Britt.) Gleason, Amer. J. Bot. 10: 301. 1923. (non *V. cuneifolia* Gardn., Hooker's J. Bot. Kew Gard. Misc. 5: 215. 1846).

*V. rusbyi* Gleason, Amer. J. Bot. 2: 753. 1932. (based upon *V. arborescens* Sw. var. *cuneifolia* Britt.).

*V. pseudomollis* Gleason, Amer. J. Bot. 10: 307. 1932. TYPE: Bolivia: Yungas, *Rusby 1658* (Holotype NY! Isotype NY!).

Semi-woody perennial **herbs**, to sprawling **shrubs**, to 3 m tall, often much branched, stems densely pubescent above especially near the inflorescence. **Leaves** cauline, usually not crowded; petioles 4-14 mm long; blades broadly lanceolate to ovate-elliptic, acuminate to acute at the apex, rounded to cuneate at the base, 9-20 cm long, 4-7 cm wide, margins almost entire to remotely toothed, sometimes revolute, scabrous to sparsely strigillose above, densely to sparsely strigillose, and sometimes glandular beneath. **Inflorescences** of terminal, scorpioid-cymes arranged into spreading panicles or corymbs. **Heads** with 18-24 florets, sessile; involucre campanulate, 5-6 mm long, loosely imbricated; phyllaries tomentose; inner phyllaries linear-lanceolate, tips acute to slightly spinulose tipped; middle phyllaries spinulose tipped, outer phyllaries lanceolate spinulose tipped. **Corollas** ca. 5 mm long, pinkish fading to white. **Pappus** white; inner bristles ca. 4 mm long, outer bristles ca. 0.8 mm long, sometimes slightly flattened. **Achenes** ca. 2.5 mm long, densely strigillose, faintly ribbed. Chromosome number:  $n = 17$ .

This species is distributed from Mexico and Central America southward into Bolivia. It occurs in tropical vegetation often in secondary scrub. Flowering and fruiting occur from July to December.

LORETO: Ucayali, Contamana, *McDaniel 14091* (F, MO, MISSA). PIURA: Huancabamba, Palambla, *Sagástegui, Cabanillas, Dios 8139* (MO) AMAZONAS: Bongara, Rio Utcubamba, *Hutchison and Wright 5865* (MO, UC, US). SAN MARTÍN: Lamas, *Ferreya 17285* (MO). HUANUCO: Cayumba entre Huánuco y Tingo Maria, *Ferreya 4196* (MO). JUNIN: Colonia Perene, *Killip and Smith 24974* (F, NY). CUZCO: Machupicchu, *Vargas 19902* (US).

25. *Vernonia fieldiana* Gleason, Bull. Torrey Bot. Club 59: 374. 1932. TYPE: Peru: San Martín: San Roque, *Williams 7663* (Holotype US, Isotype F!).

**Shrub**, ca. 1 m tall, upper stems slender, densely and closely cinereous-tomentose. **Leaves** firm, dull green; petioles stout, ca. 1 mm long; blades ovate-oblong to elliptic-ovate, sharply acute or subacuminate at the apex, rounded-cuneate at the base, ca. 3.5 cm long, ca. 1.9 cm wide, margins mostly entire, but slightly revolute and very remotely toothed, both sides inconspicuously pubescent with minute slender hairs; lateral veins curved, ascending, and parallel, strongly elevated beneath. **Inflorescences** somewhat crowded, many-flowered, compound scorpioid cymose-paniculate, its branches densely and softly cinereous-tomentose. **Heads** with ca. 11 florets, sessile; involucre broadly campanulate, 4-5 mm long, ca. 4-seriate; phyllaries densely subtomentose, loosely imbricate; inner phyllaries oblong-lanceolate, tips sharply acute; outer phyllaries triangular-lanceolate. **Corollas** ca. 5 mm long, reddish-purple. **Pappus** whitish; inner bristles ca. 4.5 mm long, outer scales ca. 1 mm long. **Achenes** ca. 1 mm long, densely sericeous.

This species is known only from Depto. San Martín in Peru. It has been collected in mountain forests at elevations of 1,200 to 1,600 m. Flowering and fruiting occur from December to February.

SAN MARTÍN: Jepelacio near Moyobamba, *Klug 3423* (F, MO, NY, US).

26. *Vernonia salzmännii* DC., Prodr. 5: 55. 1836. TYPE: Brasil: *Salzmann 1830* (Holotype G-DC, as IDC microfiche!).

*V. poeppigiana* DC., Prodr. 5: 55. 1836. TYPE: Peru: *Poeppig 1204* (Holotype G-DC, as IDC microfiche!) non. *V. poeppigiana* DC., Prodr. 5: 20. 1836.

*V. argyropappa* Buek, Index Prodr. I:IX Tom. V. (based upon *V. poeppigiana* DC., Prodr. 5: 55. 1836).

*V. geminiflora* Poepp., Poepp. & Endl. Nov. Gen. & Sp. 3: 42. 1845. (based upon *V. poeppigiana* DC., Prodr. 5: 55. 1836).

*Cacalia argyropappa* (Buek) O. Ktze., Rev. Gen. Pl. 2: 969. 1891.

*C. salzmännii* (DC.) O. Ktze., Rev. Gen. Pl. 2: 971. 1891.

**Herb** 1-2 m tall, branched, stems sparsely hirsute-pubescent with brownish hairs. **Leaves** thin but firm; almost sessile; blades ovate-lanceolate to oblong-lanceolate, acute or acuminate at the apex, gradually narrowed or obtuse at the base, 6-12 cm long, 1.5-3 cm wide, margins entire or minutely serrulate, rugose and papillate-pilose above, softly strigose-hirsute and resinous beneath. **Inflorescences** sparingly branched, of several divaricately spreading scorpioid cymes each bearing 4-10 heads, bractal leaves oblong to oblong-lanceolate. **Heads** with 21-34 florets, 1-3 cm apart; involucre campanulate or nearly hemispheric, 8-10 mm long; phyllaries sparsely pilose, erect, linear, tips narrowed to a subulate, spinose tip. **Corollas** 5-6 mm long, reddish-purple. **Pappus** white; inner bristles 6-8 mm long, outer scales ca. 1 mm long. **Achenes** ca. 3 mm long, hirsute.

This species is distributed from southern México south through Central America and northern South America into Brazil. In Peru, it occurs in the tropical selva in old clearings or secondary growth from Depto. San Martín to Depto. Madre de Dios. Flowering and fruiting occur from May to August.

SAN MARTIN: San Martín, *Ferreyra 17401* (MO, USM). HUANUCO: Huánuco: Concordia, cerca a Puente Durand, *Ferreyra 9327* (USM). JUNIN: Tarma: arriba de San Ramón, *Ferreyra 16321* (USM). CUZCO: Convencion: *Vargas 13170* (US). MADRE DE DIOS: Iberia, vic. Rio Thuamanu, *Seibert 2125* (MO, F, US).

27. *Vernonia herbacea* (Vell.) Rusby, Mem. Torrey Bot. Club 4: 209. 1895.

*Chrysocoma herbacea* Vell., Fl. Flum. 330. 1825. TYPE: as illustration, Atlas Tab. 29. T 8. 1835.

*Vernonia obovata* Less., Linnaea 4: 279. 1829. TYPE: Brasil: *Sellow s.n.* (not seen).

*V. paucifolia* Rusby, Mem. Torrey Bot. Club 3: 50. 1893. TYPE: Bolivia: Yungas, *Bang 247* (NY).



Perennial **herb**, stems villous to hirsute, pubescence straw-colored. **Leaves** cauline; sessile; blades obovate to obovate-lanceolate, obtuse at the apex, cuneate at the base, 6-7 cm long, 2.5-3.5 cm wide, margins slightly revolute, pubescent, remotely hirsute above, upper surface of leaf dark brown when dry, villous to hirsute with straw-colored pubescence beneath. **Inflorescences** terminal, condensed scorpioid-cymose to corymbose. **Heads** with 12-13 florets, short pedunculate; involucre broadly campanulate, ca. 7 mm long, 3- to 4-seriate; phyllaries strigose, loosely appressed; inner phyllaries lanceolate-oblong, tips acute to acuminate or slightly aristate; outer phyllaries tips lanceolate. **Corollas** ca. 8 mm long, dark reddish-purple, sparsely glandular. **Pappus** white; inner bristles ca. 7 mm long, outer bristles ca. 1 mm long. **Achenes** ca. 2 mm long, strigose.

This species is distributed from southern Brazil northward into Peru. It is apparently uncommon in Peru since only one collection has been seen. Flowering and fruiting occur from May to June.

JUNIN: Chanchamayo Valley, *Schunke 1527* (F).

## II. PIPTOCARPHA<sup>6</sup>

**Piptocarpha** R. Br., *Trans. Linn. Soc. London* 12: 121. 1817. (1818).  
**TYPE:** *P. brasiliiana* Cass., *Dict. Sc. Nat.* 41: 109. 1826.

*Carphobolus* Schott, *Spreng. Syst. iv. Cur. Post.* 409. 1827. **TYPE:** *C. sessiliflorus* Schott.

*Monanthemum* Griseb., *Fl. Brit. W. Ind.* 354. 1861. **TYPE:** *M. cruegerii* Griseb.

**Shrubs**, usually scandent or infrequently trees, especially in some Brazilian species; branches pubescent, stellate-tomentulose or lepidote. **Leaves** alternate, petiolate, blades large, ovate to lanceolate, entire to subentire, pinnately veined with prominent ascending lateral veins, arching and anastomosing near the margins, glabrous above, often tomentose with stellate trichomes or lepidote beneath, bases usually oblique. **Inflorescences** aggregated at base of leaves (often reduced toward apex of stem and on secondary branches) in axillary corymbs, umbels or sessile to subsessile in axillary clusters or in axillary and terminal panicles. **Heads** with 1-35 florets; involucre campanulate, cylindrical-campanulate to turbinate; phyllaries imbricated in several series, the outer bracts persistent, small, triangular-ovate, apex obtuse, tomentulose, upper margin ciliate to fimbriate; inner bracts narrowly ovate to oblong to lanceolate, apex tomentulose to glabrous, acute, often with a dark tip, curling and usually deciduous with achenes; receptacle convex, flowers in species with turbinate or broadly campanulate involucre subtended by distinct, linear-lanceolate, scarious paleas with acuminate tips, deciduous with achenes; in species with cylindrical to narrowly campanulate involucre (usually with 6 or less florets), paleas absent. **Corollas** regular, narrowly tubular, 5-lobed; stamens 5, anthers apically acute, bases sagittate with auricles acute to caudate; style branches slender, acute, stigma bifid, the stigmatic surface hispid. **Pappus** biseriate, the inner series of long, filiform, equal bristles, the outer series of shorter, filiform, unequal bristles or paleaceous scales, often inconspicuous or absent in some species. **Achenes** glabrous or infrequently pilose, cylindrical or angled, often 10-costate, apex truncate.

<sup>6</sup>Mr. Gerald L. Smith, a pre-doctoral student, is presently revising *Piptocarpha* and generously contributed to this treatment. His assistance is gratefully acknowledged.

*Piptocarpha* is a small neotropical genus of ca. 40 species, extending southward from the West Indies and Central America into northern and central South America.

## REFERENCE

ELIAS, THOMAS S. 1975. Fl. of Panama. Part IX. Compositae. Ann. Missouri Bot. Gard. 62(4):860.

### KEY TO SPECIES OF *Piptocarpha*

- a. Inflorescences of 20-60 heads.
  - b. Inflorescences of terminal and axillary panicles of heads clustered at the ends of branchlets ..... 7. *P. gutierrezii*.
  - bb. Inflorescences of axillary, branching corymbose clusters of heads.
    - c. Heads with 3 florets; involucre campanulate; leaves basally cuneate ..... 5. *P. sprucei*.
    - cc. Heads with 6 florets; involucre ovoid-campanulate; leaves basally oblique.
      - d. Lower leaf surface densely appressed, cinereous-tomentose with stellate trichomes; phyllaries sparsely tomentose at apex .... 1. *P. poeppigiana*.
      - dd. Lower leaf surface thinly gray-pubescent with stellate trichomes; phyllaries densely tomentose at apex ..... 4. *P. canescens*.
  - aa. Inflorescences of 4-16 heads.
    - e. Inflorescences of axillary, stoutly pedunculate clusters of heads; involucre campanulate ..... 6. *P. lechleri*.
    - ee. Inflorescences of axillary clusters of subsessile heads; involucre turbinate.
      - f. Lower leaf surface yellow-gray tomentose with stellate trichomes; branches cinnamon-tomentose with stellate trichomes ..... 2. *P. asterotrichia*.
      - ff. Lower leaf surface cinereous to yellow-brown tomentose with stellate trichomes; branches cinereous-tomentulose or lepidote ..... 3. *P. opaca*.

### 1. *Piptocarpha poeppigiana* (DC.) Baker in Mart., Fl. Bras. 6(2): 131. 1873.

*Vernonia poeppigiana* DC., Prodr. 5:20. 1836. TYPE: Peru; *Poeppig 1425* (Holotype: G-DC, as microfiche G-DC!, photo NY! Isotypes: G! P! BM! B as photos GH! NY!).

*Vernonia tereticaulis* DC., Prodr. 5:20. 1836. TYPE: Peru; *Haenke s.n.* (Holotype: PR! Isotypes: G-DC, as microfiche G-DC! P! F!).

*Carphobolus poeppigiana* (DC.) Sch. Bip., Pollichia 20/21:422. 1863.

*Carphobolus tereticaulis* (DC.) Sch. Bip., Pollichia 20/21: 422. 1863.

*Piptocarpha tereticaulis* (DC.) Baker in Mart., Fl. Bras 6(2): 131. 1873.

*Piptocarpha chontalensis* Baker in Mart., Fl. Bras. 6(2): 132. 1873. TYPE: Nicaragua: *Tate 163* (Lectotype: K! [selected from among syntypes] Isolectotype: BM! Syntypes: BM!).

*Piptocarpha costaricensis* Klatt, Bull. Soc. Bot. Belg. 31(1): 184. 1892. TYPE: Costa Rica: *Pittier 4927* (Lectotype: GH! [selected from among syntypes] Isolectotypes: GH! M! BR!).

*Piptocarpha laxa* Rusby, Bull. New York Bot. Gard. 8(28): 123. 1912. TYPE: Bolivia: Charopampa, Williams 703 (Holotype: NY! Isotypes: K! BM! US!).

*Piptocarpha foliosa* Cuatrec., Brittonia 8: 161. 1955. TYPE: Colombia: Amazonas, Tacana, Castanal igapó, Schultes & Black 46-82 (Holotype: US!).

*Piptocarpha paraensis* Cabrera, Arquiv. Jard. Bot. Rio de Janeiro 15: 73. 1957. TYPE: Brazil: Para: Rio Tapajoz, Pimentel, Ducke 21-VIII-1923 (Holotype: LP! Isotypes: RB!).

Subscandent **shrub** to drooping **liana** with branches 3-30 m long; stems cinereous to yellow-brown tomentulose-lepidote. **Leaves** cauline, not crowded; petioles sulcate, 1-2.5 cm long; blades coriaceous, elliptic to oblong-ovate to broadly ovate, acute to acuminate at the apex, oblique at the base, 7-20 cm long, 4-10 cm broad, margin revolute, sometimes faintly toothed; glabrous above except tomentulose on midvein, densely cinereous to yellow-brown stellate-tomentose, occasionally glandular beneath, lateral veins 6-8 pairs. **Inflorescences** in dense axillary corymbose clusters of 20-60 heads. **Heads** usually with 6 florets, sessile or shortly pedicellate in groups of 2 or 3 at the ends of tomentose peduncles; involucre ovoid to narrowly campanulate, 5-7 mm long, 3-4 mm broad, 4-seriate; phyllaries tomentulose at tips, margins ciliate to fimbriate; outer phyllaries triangular-ovate, acute, persistent; inner phyllaries oblong to lanceolate, acute, deciduous. **Corollas** 4-5 mm long, glabrous, the lobes 1.5-3 mm long, revolute, white, fragrant; anthers 3 mm long, basal auricles caudate, 0.4 mm long. **Pappus** white, biseriate, the inner series of equal, filiform bristles 5-6.5 mm long, the outer series of short, inconspicuous bristles 0.5-1 mm long. **Achenes** 2.5-3 mm long, 10-costate, glabrous or sparsely pilose.

This species is distributed throughout tropical regions from southern Mexico to central Bolivia. It is most frequently found along rivers in tropical forests at elevations of 250-1,000 m. Flowering and fruiting occur mainly from July to November but occasionally the year round.

LORETO: Previsto, Woytkowski 7566 (MO, UC, US). AMAZONAS: Bagua, Rio Santiago, Wurdack 2501 (F, UC, USM). SAN MARTIN: Lamas, Belshaw 3445 (F, MO, UC). HUANUCO: Tingo Maria, Ferreyra 891 (US, USM). JUNIN: Mazamar., Woytkowski 5966 (MO, US). CUZCO; Paucartambo, Marin 1697 (F).

2. *Piptocarpha asterotrichia* (Poepp. & Endl.) Baker in Mart., Fl. Bras. 6(2): 127. 1873.

*Vernonia asterotrichia* Poepp. & Endl., Nov. Gen. & Sp. 3:41-42 t. 247. 1843. TYPE: Peru: Poeppig 1887 (Holotype: W! Isotypes: P! NY! GH!).

*Carphobolus asterotrichus* (Poepp. & Endl.) Sch. Bip., Pollichia 20/21: 426. 1863.

*Piptocarpha insignis* Gleason, Bull. Torrey Bot. Club 59: 371-372. 1932. TYPE: Peru: Junin, San Nicolas, Pichis Trail, Killip & Smith 26083 (Holotype: NY! Isotype: US!).

A high-climbing, wide-spreading, much-branched **liana** with branches reaching 3-15 m, often in trees, showy; stems densely cinnamon-stellate tomentose. **Leaves** cauline, not crowded; petioles sulcate, densely yellow-gray stellate-tomentose, 0.8-1.7(2.5) cm long; blades ovate-oblong to lanceolate, acuminate at the apex, oblique or rounded to subcordate at the base, 6-19 cm long, 3-9 cm wide, margins slightly revolute and very faintly remotely toothed, glabrous, opaque, glandular above except yellow-gray stellate-tomentose on major veins, prominently reticulately veined when dry, 5-8 pairs of lateral



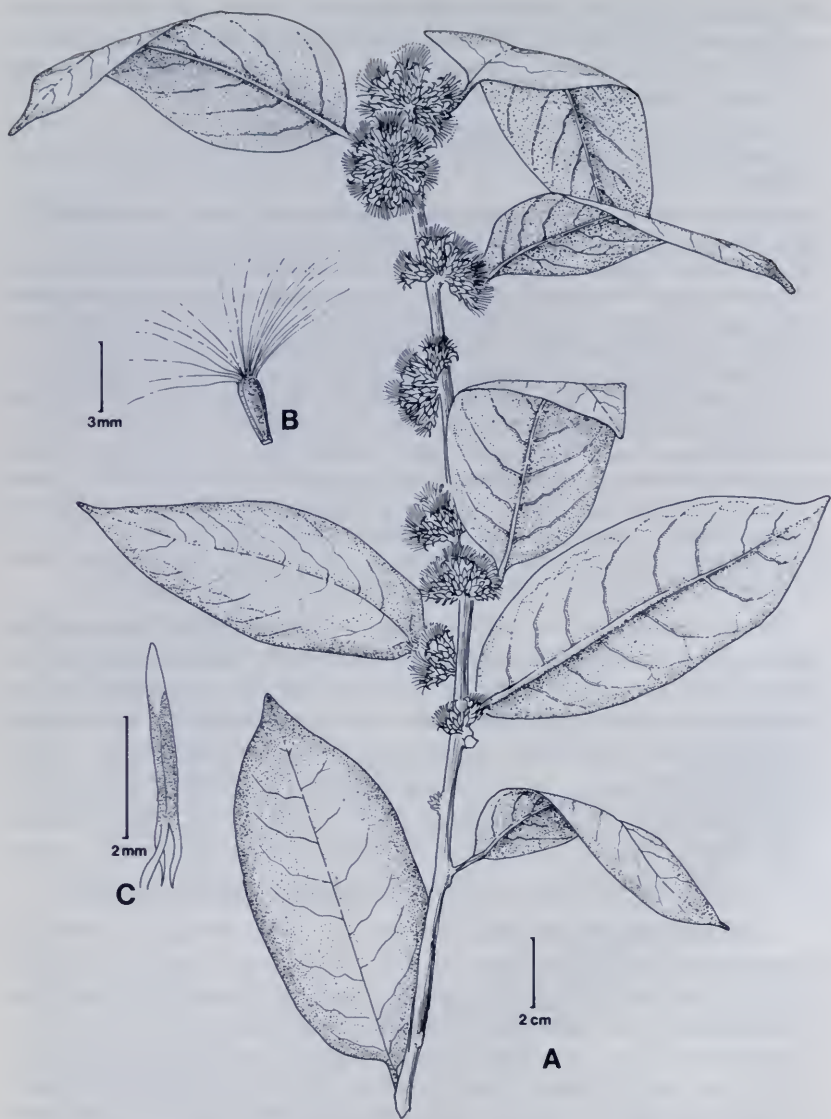


FIG. 4. *Piptocarpha asterotrichia*. A, habit; B, achene; C, anther. (From Schunke 263, F.)

veins, densely yellow-gray stellate-tomentose beneath. **Inflorescences** in dense, rounded, axillary, clusters of 4-10 subsessile heads, number of heads in glomerules reduced toward apex of stem (seemingly forming flat "sprays" in the fresh condition). **Heads** with 11-35 florets, subsessile; involucre broadly turbinate, 10-17 mm long, 4-10 mm wide, closely imbricate in 5-6 series, when fresh the involucre is brilliant yellow-green; phyllaries ciliate on the margins, rarely pubescent; outer phyllaries persistent, ovate, apex acute with a dark tip; inner phyllaries deciduous, lanceolate, apex acute; flowers subtended by linear-lanceolate paleas, tips acuminate, deciduous with achenes. **Corollas** 6-7.5 mm long, creamy white, fragrant, sometimes glandular, lobes revolute, 2-3 mm long; anthers ca. 4 mm long, basal auricles sharply acute, 0.2 mm long. **Pappus** white, predominately uniseriate, inner bristles equal, 6-8 mm long, outer bristles less than 1 mm long, totally absent in some specimens. **Achenes** 3.5-4.5 mm long, angled, indistinctly costate, glabrous.

This species is distributed from Colombia south to the Cordillera Real in eastern Bolivia. It occurs at elevations of 425-1,500 m in tropical forests, montane rain forests, at lower edges of cloud forests, and in secondary growth. Flowering and fruiting occur mainly from June to December but occasionally throughout the year.

*Piptocarpha insignis* Gleason is considered to be a very robust form of *P. asterotrichia*. It is known only from the type collection and differs only from typical *P. asterotrichia* specimens by its larger heads.

AMAZONAS: Quebrada Aintami, *Kayap 690* (GA, MO). SAN MARTIN: Lamas, *Belshaw 3434* (F, MO, UC). JUNIN: San Ramon, *Killip & Smith 24747* (F, US). CUZCO: Convencion, *Dudley 10282* (MO). LORETO: Maynas, Tocache, *Poeppig 1887* (W, P, NY, GH).

### 3. *Piptocarpha opaca* (Benth.) Baker in Mart., Fl. Bras. 6(2): 124. 1873.

*Vernonia opaca* Benth., in Hooker Lond. J. Bot. 2: 39. 1840. TYPE: Guyana: Serra Mey, *Schomburgk 1016* (Holotype: K! Isotypes: K! BM!).

*Carphobolus latifolius* Sch. Bip., Pollichia 20/21: 426. 1863. TYPE: Brasil: Para: in vicinity of Obidos, *Spruce Dec. 1849* (Holotype: K! Isotypes: BM! M! NY! GH!).

*Piptocarpha opaca* (Benth.) Baker var. *latifolia* (Sch. Bip.) Baker in Mart., Fl. Bras. 6(2):124. 1873.

A highly scandent, much-branched liana with branches 3-12 m long, often in trees, stems cinereous, appressed tomentulose-lepidote. **Leaves** cauline, not crowded; petioles sulcate, cinereous tomentose-lepidote, 1-2 cm long; blades coriaceous, elliptic to ovate-oblong to broadly ovate, acuminate at the apex, oblique at the base, 7-13 cm long, 3-5 cm wide, margins slightly revolute and remotely toothed, glabrous and somewhat lustrous above, 6-8 pairs of lateral veins, densely stellate-tomentose and yellow-brown lepidote beneath. **Inflorescences** in dense axillary, hemispheric to rounded clusters of 6-15 heads. **Heads** with 9-12 florets, subsessile; involucre turbinate, 7.5-11 mm long, 3.5-5 mm wide, imbricate in 5-6 series; phyllaries darkened and tomentulose at tips, especially in outer phyllaries, margins ciliate to fimbriate; outer phyllaries persistent, ovate, apex

acute to obtuse; inner phyllaries deciduous, narrowly ovate to oblong, apex acute; flowers subtended by linear-lanceolate paleas, tips acuminate, deciduous with achenes. **Corollas** 4-5 mm long, purple-white, very fragrant, glabrate, lobes revolute, 1.5-2.5 mm long; anthers 3-4 mm long, basal auricles caudate, 0.4 mm long. **Pappus** white, biseriate, the inner series of bristles equal, filiform, 5-6 mm long, the outer series poorly developed, bristles short, unequal, 0.5-1 mm long. **Achenes** 2.5-3 mm long, cylindrical to 3-angled, 10-costate, glabrous or sparsely pilose.

This species is distributed throughout the range of the Amazon River. It occurs most frequently in secondary woods with sandy soil along the margins and upland regions of the Amazon River at elevations of 25-700 m.

LORETO: tributary of Rio Nanay near Iquitos, *McDaniel 10749* (GA). LORETO: Iquitos, *Vandemann 2260* (K). AMAZONAS: Rio Santiago-Rio Pongo de Manseriche, *Tessmann 3694* (NY, G, S).

4. **Piptocarpha canescens** Gleason, Bull. Torrey Bot. Club 59: 373. 1932. TYPE: Peru: Junin: San Nicholas, *Killip & Smith 26084* (Holotype: NY! Isotype: US!).

Subscandent shrub, ca. 3-4 m tall, stems densely cinereous-pubescent. Leaves cauline, petioles stout, densely tomentose, 1-2 cm long; blades thin, elliptic-oblong to elliptic-ovate, acute to acuminate at apex, oblique at base, ca. 15-21 cm long, 6-10 cm wide, margins revolute, primary and secondary veins elevated beneath, glabrous, opaque above except densely stellate-tomentose on the midvein, 8-10 pairs of lateral veins, stellate-pubescent beneath. **Inflorescences** in axillary, branching, corymbose clusters, ca. 2.5 cm in diameter (when pressed) with ca. 40 heads. **Heads** with 6 florets, shortly pedicellate terminating peduncles, pedicels and peduncles densely stellate-tomentose, heads immature on the specimen examined; phyllaries (when dry) brown with dense grayish brown pubescence at the tips; inner phyllaries ovate, tips acute; outer phyllaries ovate.

According to Gleason, this species is distributed in Depto. Junin. It occurs in dense forest at ca. 1,100 m. It either is not abundant or has been poorly collected. Flowering and fruiting occur from July to September. The only collection examined is the type.

5. **Piptocarpha sprucei** Baker in Mart., Fl. Bras 6(2): 129. 1873. TYPE: Peru: Tarapoto, *Spruce 4362* (Holotype: K! Isotypes: BR! P! F! NY! BM! G! W! GH! E!).

Liana, stems densely and finely canescent, strongly 4-angled. Leaves cauline; petioles slender, ca. 0.5 cm long; blades elliptic, somewhat rigid and coriaceous when dry, acuminate at the apex, cuneate at the base, 8-13 cm long, 2.5-6 cm wide, margins slightly revolute, remotely toothed, glabrous above but canescent along midvein, veins elevated (in dry specimens), glabrate to cinereous lepidote-black glandular beneath. **Inflorescences** in dense axillary corymbose clusters of ca. 35 heads, ca. 1.2 cm wide. **Heads** with 3 florets, sessile in groups of 2 at the ends of stout, tomentose peduncles; involucre campanulate, 4-5 mm long; phyllaries yellow-brown with a dark tip when dry, tomentulose at



apex, upper margin finely ciliate; outer phyllaries persistent, ovate, apex obtuse; inner phyllaries deciduous with achenes, ovate-oblong, apex acute to obtuse. **Corollas** ca. 3 mm long, white, glabrate but with occasional glands, lobes revolute 1.5-3 mm long; anthers ca. 3 mm long, basal auricles acute, less than 0.1 mm. **Pappus** white biseriate, inner bristles equal, filiform, ca. 6 mm long, outer bristles inconspicuous, short, unequal, 0.5-1 mm long. **Achenes** ca. 3 mm long, 10-costate, glabrous or sparsely pilose.

This species is found in forests in Loreto where it is rare or poorly collected. Flowering and fruiting occur from August to September. It appears to be closely allied with the Brazilian species *Piptocarpha leprosa* (Less.) Baker, and further study may show *P. sprucei* to be the northern range of *P. leprosa*.

LORETO: Pumayacu, King 3167 (F, MO). LORETO: Tarapoto, Spruce 4362 (K, BR, P, F, NY).

6. *Piptocarpha lechleri* (Sch. Bip.) Baker in Mart., Fl. Bras. 6(2): 127. 1873.

*Carphobolus lechleri* Sch. Bip., Pollichia 20/21: 428. 1863. TYPE: Peru: prope St. Gavan, Lechler 2479 (Holotype: B as photos F! NY! GH! Isotypes: K! G!).

*Piptocarpha vismiaefolia* Gleason, Bull. Torrey Bot. Club 59: 372. 1932. TYPE: Peru: Junin: La Merced, Killip & Smith 23848 (Holotype: NY! Isotypes: K! F! US!).

*Piptocarpha longifolia* Gleason, Bull. Torrey Bot. Club 59: 372-373. 1932. TYPE: Peru: Junin, Pichis Trail, Yapas, Killip & Smith 25459 (Holotype: NY! Isotype: US!).

**Shrubs to slender trees**, 3-6 m high, branches slender, long, widely spreading, stems cinereous, appressed tomentulose-lepidote. **Leaves** cauline, not crowded; petioles stout, sulcate, densely tomentose, 1-2 cm long; blades large, coriaceous, oblong to lanceolate, acuminate at the apex, oblique at the base, 10-22 cm long, 3-10 cm wide, margins slightly revolute and remotely toothed, glabrous and lustrous above, 6-10 pairs of prominent lateral veins, densely cinereous stellate-tomentose and yellow-brown lepidote beneath. **Inflorescences** in dense, axillary, rounded, umbellate clusters of 9-16 heads. **Heads** with 10-20 florets, stoutly pedicellate, singly or in groups of 2 or 3, at the ends of stout peduncles of a uniform length giving an umbellate appearance to inflorescences; involucre broadly campanulate at maturity, 8-10 mm long, 4.5-5.5 mm wide, imbricate in 5-6 series; phyllaries uniformly brown when dried, nearly glabrous; outer phyllaries persistent, ovate, margin minutely ciliate, apex obtuse; inner phyllaries deciduous with achenes, oblong-lanceolate, apex acute; flowers subtended by linear, acuminate paleas, deciduous with inner involucre phyllaries. **Corollas** 4-5 mm long, white, glabrate, lobes revolute, 1.5-2.5 mm long; anthers 3.5-4 mm long, basal auricles caudate, 0.3 mm long. **Pappus** white, predominately uniseriate, inner bristles equal, 5-6 mm long, outer bristles inconspicuous, less than 1 mm long, totally absent in some specimens. **Achenes** 3-3.5 mm long, 10-costate, glabrous or sparsely pilose.

This species is distributed in the Peruvian Andes to eastern Bolivia. It occurs at elevations of 360-1,600 m in dense montane rain forests. Flowering and fruiting occur from June to November.

PERU: near St. Gavan, *Lechler 2479* (B, K, G). JUNIN: La Merced, *Killip & Smith 23848* (NY, K, F, US). JUNIN: Pichis Trail, Yapas, *Killip & Smith 25459* (NY, US). SAN MARTIN: Alto Rio Huallaga, *Williams 6675* (US). CUZCO: San Lorenzo, *C. Vargas C. 11749* (US).

7. *Piptocarpha gutierrezii* Cuatrec., *Brittonia* 8(2): 161-162. 1955. TYPE: Colombia: Antioquia, Municipio Sonsón: region de Rioverde, Orilla de Rio Verde de los montes, *Gutierrez 35633* (Holotype: F! Isotype: MO!).

*Piptocarpha umbricola* Cuatrec., *Brittonia* 8(2): 163. 1955. Type: Colombia: Comisaria de Putumayo: Umbria, *Klug 1863* (Holotype: F! Isotypes: GH! NY! S! US!).

Scandent shrubs, 3-6 m high, branches slender, spreading, stems glabrate to minutely silvery lepidote. Leaves cauline, not crowded; petioles slender, sulcate, appressed yellow-brown tomentulose-lepidote, 0.5-2 cm long; blades large, papery, elliptic to ovate to ovate-lanceolate, acute to abruptly acuminate at apex, oblique or cuneate to slightly rounded at the base, 9-16 cm long, 4-8 cm wide, margins slightly revolute, entire to very faintly and remotely toothed, glabrous, opaque above, 6-8 pairs of prominent lateral veins, densely and closely silvery cinereous lepidote-tomentose beneath. Inflorescences in axillary and terminal panicles. Heads with 6 florets, clustered in groups of 6-12 on stout peduncles at the ends of lateral branchlets; involucre cylindrical-campanulate, 6-7 mm long, ca. 3 mm wide, closely imbricate in 3-4 series; phyllaries straw-colored with brown-purple tips, nearly glabrous; outer phyllaries persistent, ovate, margins ciliate, apex obtuse, inner phyllaries deciduous with achenes, ovate-oblong, apex obtuse to acute. Corollas 3.5-4 mm long, white, glabrate, lobes revolute 1.5-2 mm long; anthers ca. 3 mm long, basal auricles caudate, 0.3 mm long. Pappus biseriate, the inner bristles equal, filiform, 5-5.5 mm long, the outer bristles irregular, short, unequal, 0.5-1 mm long. Achenes immature, ca. 2.5 mm long, costate, sparsely pilose.

This species is distributed in the northern Andes ranging from NW Venezuela to N Peru. It occurs in dense montane rain forest and along rivers at elevations of 300-700 m. Flowering and fruiting occur mainly from July to November but occasionally the year round.

AMAZONAS: Lugar Aintami, *Kayap 356* (NY).

### III. POLLALESTA

*Pollalesta* H.B.K., *Nov. Gen. & Sp.* 4: 46. 1820. TYPE: *P. vernonioides* H.B.K.

*Oliganthes* Cass., *Bull. Soc. Philom. Paris* 10. 1817. TYPE: *O. triflora* Cass.

*Odontoloma* H.B.K., *Nov. Gen. & Sp.* 4: 43. 1820. TYPE: *O. acuminata* H.B.K.

*Dialesta* H.B.K., *Nov. Gen. & Sp.* 4: 45. 1820. TYPE: *D. discolor* H.B.K.

*Adenocyclus* Less., *Linnaea* 4: 337. 1829. TYPE: *A. condensatus* Less.

Shrubs to trees, usually diffusely branched, branches often tomentose. Leaves alternate, petiolate; blades lanceolate to ovate, usually elliptic, cuneate at the base, occasionally oblique, apex acute to long acuminate, margins entire to subserrate, be-

coming glabrate above, densely stellate below, punctate-glandular both above and below. **Inflorescences** terminal, corymbose-paniculate. **Heads** with 1-5 florets; involucre cylindrical to narrowly campanulate to strongly compressed; phyllaries 5-18, imbricate, membranous to scarious, receptacle subconvex to flat, naked. **Corolla** tubular, 5-lobed; stamens 5, anthers basally sagittate; style branches slender. **Pappus** variable, usually of 2 series, outer series of short scales, usually separate but occasionally coroniform, sometimes absent; inner pappus of 0-15 aristate bristles. **Achenes** obconic to slightly truncate, 8-10 ribbed.

*Pollalesta* is a small neotropical genus ranging from Central America south into Peru and northern Brasil. One species occurs in Peru.

#### REFERENCE

ARISTEGUIETA, L. 1963. El genero *Oliganthes* de Madagascar y su equivalente Americano *Pollalesta*. Bol. Soc. Venez. Ci. Nat. 23(103): 255-288.

1. *Pollalesta discolor* (H.B.K.) Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 275. 1963.

*Dialesta discolor* H.B.K., Nov. Gen. & Sp. 4: 45. 1820. TYPE: Colombia: Honda, Bonpland s.n. (Holotype P, as photo GH! Isotype B, as photo GH!).

*Eupatorium cuspidatum* Willd. ex Less., Linnaea 4: 315. 1829. TYPE: 15156 (Holotype B, as microfiche Willd. Herb.!).

*Oliganthes discolor* (H.B.K.) Sch. Bip., Linnaea 20: 502. 1847.

*O. karstenii* Sch. Bip., Linnaea 30: 116. 1859-1860. TYPE: Colombia: Guaduas, Karsten s.n. (Isotype F!).

*O. ferruginea* Gleason, N. Amer. Fl. 33: 102. 1922. TYPE: Costa Rica: Forests of Alto de Mano Tigre, Diquis Valley, Pittier 12138 (Holotype US!).

*O. corei* Cuatrec., Brittonia 8: 185. 1956. TYPE: Colombia: Dept. Antioquia, El Radio, Core 720 (Holotype WVA! as photo GH! NY! Isotype US!).

*Pollalesta argentea* Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 275. 1963. TYPE: Peru: Dept. Cajamarca: Valle del Rio Tabaconas, Weberbauer 6162 (Holotype F!).

*P. brasiliiana* Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 280. 1963. TYPE: Brasil: Amazonas: São Paulo de Olivenca, Ducke 298 (Holotype NY! Isotype MO!).

*P. colombiana* Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 274. 1963. TYPE: Colombia: Villavincencio, Pennell 1406 (Holotype NY! Isotypes GH! US!).

*P. corei* (Cuatrec.) Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 276. 1963.

*P. ecuatoriana* Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 277. 1963. TYPE: Ecuador: Prov. Napo-Pastaza: cerca de Puyo, Skutch 4428 (Holotype NY, Isotype MO!).

*P. ferruginea* (Gleason) Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 273. 1963.

*P. karstenii* (Sch. Bip.) Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 273. 1963.

*P. klugii* Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 278. 1963. TYPE: Peru: Dept. Loreto: Fortaleza, cerca de Yurimaguas, Klug 2819 (Holotype GH! Isotype MO!).

*P. peruviana* Aristeg., Bol. Soc. Venez. Ci. Nat. 23(103): 277. 1963. TYPE: Peru: Dept. Loreto: Mishuyaca, cerca de Iquitos, Klug 1242 (Holotype F!).



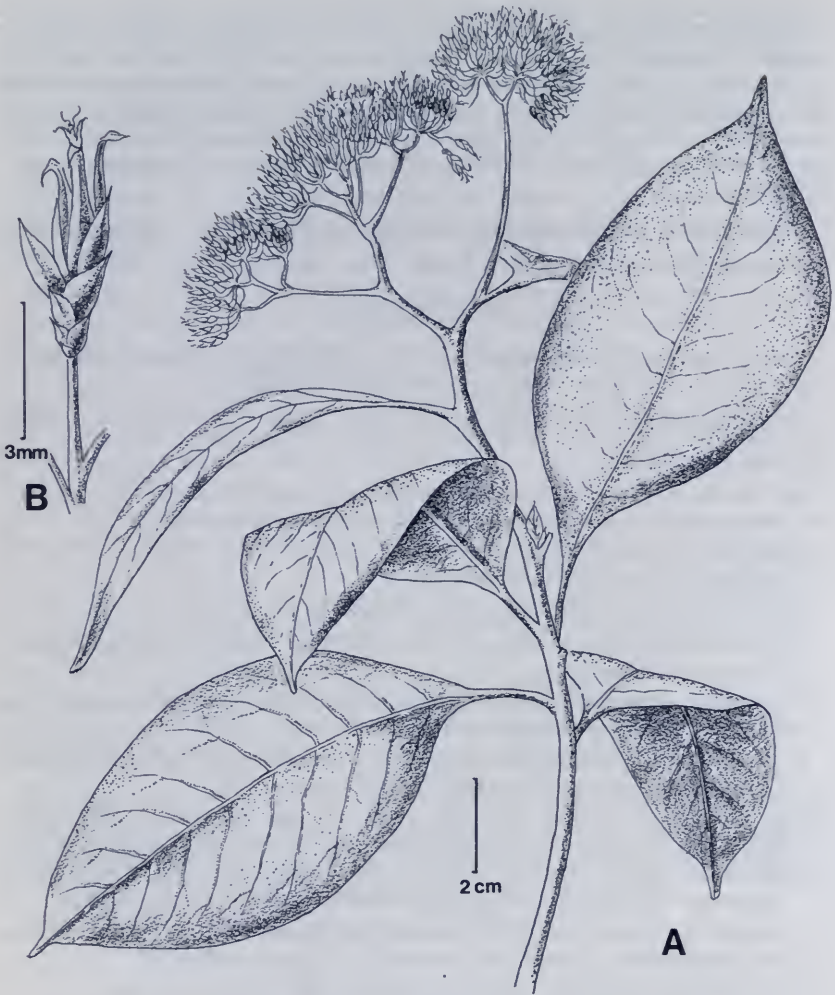


FIG. 5. *Pollalesta discolor*. A, habit; B, head. (From Klug 2220, F.)

**Tree**, 10 to 30 m tall, of a single trunk branched in the crown, young stems stellate pubescent, brown to grayish. **Leaves** somewhat crowded at tips of stems; petiole 1-3.5 cm long; blades elliptic to lanceolate or ovate, acute to long acuminate at the apex, cuneate to oblique at the base, 5-20 cm long, 1.5-9 cm wide, margins mostly entire, sometimes remotely serrate, becoming glandular punctate and glabrate except pubescent on midvein and at base above, densely stellate-pubescent beneath. **Inflorescences** terminal corymbose-paniculate. **Heads** with (1)2(3) florets, pedunculate; involucre narrowly cam-

panulate, 4.5-9 mm long; phyllaries often ciliate, glabrous to slightly pubescent, glandular punctate near the tips, yellowish-brown, sometimes with dark tips; inner phyllaries oblanceolate; tips acute; outer phyllaries elliptic-ovate. **Corollas** 5.5-7.5 mm long, whitish to light purple with glandular dots, fragrant. **Pappus** straw-colored; inner bristles ca. 3-4 mm long, outer scales minute to 1.2 mm long. **Achenes** 1.8-2.4 mm long, obconic, gland-dotted, sometimes thinly pubescent, 8-10 ribbed.

This species is distributed from Costa Rica into Peru in tropical forest or secondary vegetation from 100-1,600 m elevation. Flowering and fruiting throughout the year.

LORETO: Florida, Rio Putumayo at mouth of Rio Zubineta, *Klug 2220* (BM, F, GH, MO, NY, S, US). AMAZONAS: Rio Cenepa, *Anacuash 302* (MO). CAJAMARCA: Valle del Rio Tabaconas, *Weberbauer 6162* (F, GH, US). SAN MARTIN: Moyobamba, *Klug 3578* (F, GH, K, MO, NY, S).

#### IV. CENTRATHERUM

**Centratherum** Cass., *Dict. Sci. Nat.* 7: 384. 1817. TYPE: *C. punctatum* Cass.

*Spixia* Schrank, *Pl. Rar. Hort. Monac.* tab. 80. 1819. TYPE: *S. violacea* Schrank.

*Ampherephis* H.B.K., *Nov. Gen. & Sp.* 4: 31. 1820. TYPE: *A. mutica* H.B.K.

*Amphibecis* Shrank, *Syll. Pl. Nov.* 1: 86. 1824. TYPE: *A. violacea* Schrank.

*Crantzia* Vell., *Fl. Flum.* viii. tab. 153. 1835. TYPE: *C. ovata* Vell.

**Herbs to subshrubs**, often branched, stems glabrescent to villous. **Leaves** alternate, petiolate to sessile; petioles often indistinct, blades ovate, linear, or oblanceolate, obtuse, or subacute to blunt at the apex, cuneate to attenuate at the base, margins serrate, lobed, glabrous, punctate, or pubescent above and beneath. **Inflorescences** with heads terminal on axillary branches, occasionally 2 or 3 heads clustered together. Heads with numerous florets, sessile; involucre cylindric-campanulate, 8-25 mm wide; phyllaries in several series, outer series foliaceous, intergrading to firm scales, tips variable, rounded to long awned. **Corollas** tubular, 5-lobed, reddish-purple, glandular, tube sometimes pubescent. **Pappus** straw-colored, deciduous, of bristles, infrequently absent. **Achenes** 8-10 ribbed, obconic. Chromosome number:  $n = 16, 32$ .

*Centratherum* is a small tropical genus of two species found in the New World, in Australia, and the Philippines. Formerly, the genus *Centratherum* included species from India and Java. Based on chromosome numbers, pollen morphology, and trichome morphology correlated with geographical distribution, these Old World species are presently recognized as the genus *Phyllocephalum*.

#### REFERENCE

KIRKMAN, L. K. Revision of *Centratherum* and *Phyllocephalum* (Compositae: Vernoniaeae), *Rhodora* (in press).



FIG. 6. *Centratherum punctatum*. A, habit; B, head. (From Woytkowski 7643, F.)



1. ***Centratherum punctatum*** Cass. Dict. Sc. Nat. 7: 384. 1817. TYPE: Panama: *Jussieu s.n.* (Holotype: P-JU, as IDC microfiche cat. number 8420-JU!).

*Spixia violacea* Schrank, Pl. Rar. Hort. Monac. Tab. 80. 1819. TYPE: as illustration GH!.

*Ampherephes aristata* H.B.K., Nov. Gen. & Sp. 4: 31. 1820. TYPE: *Bonpland s.n.* (Holotype: P, as photo TEX!; Isotype P!).

*A. mutica* H.B.K., Nov. Gen. & Sp. 4: 31. 1820. TYPE: *Humboldt & Bonpland* (Holotype: P, as photo GH!).

*Amphibecis violacea* (Schrank) Schrank, Syll. Pl. Nov. 1: 86. 1824.

*Ampherephes pulchella* Cass., Dict. Sc. Nat. 57: 346. 1828. TYPE: *d'Urville and Lesson s.n.* not seen.

*A. pilosa* Cass., Dict. Sc. Nat. 57: 346. 1828. TYPE: based upon *A. mutica* Kunth.

*Centratherum brevispinum* Cass., Dict. Sc. Nat. 57: 346. 1828. TYPE: same as *A. aristata* H.B.K.

*C. longispinum* Cass., Dict. Sc. Nat. 57: 346. 1828. TYPE: based upon *C. punctatum* Cass.

*Ampherephes intermedia* Link, Abbild. 5 tab. 29. 1828. TYPE: not seen.

*Centratherum muticum* (H.B.K.) Less., Linnaea 4: 320. 1829.

*C. intermedium* (Link) Less., Linnaea 4: 320. 1829.

*Crantzia ovata* Vell., Fl. Flum. viii. tab. 153. 1835. TYPE: as illustration!.

*Centratherum pulchellum* (Cass.) Steud., Nom. ed. II. 324. 1840.

*C. punctatum* Cass. var. *parviflorum* Baker in Mart., Fl. Bras. 6(2): 12. 1873. TYPE: *Blanchet 3689* (BRAZIL: Bahia: Holotype: K! Isotypes: BR! F! G! LE! MO! P!).

*C. holotoni* Baker in Mart., Fl. Bras 6(2): 12. 1873. TYPE: BRAZIL: *Ibague, Holton 301* (Holotype: K!).

*C. brachylepis* Sch. Bip. ex Baker in Mart., Fl. Bras. 6(2): 12. 1873. TYPE: BRAZIL: *Martius 461* (Holotype: M! as photo GH! NY! TEX!).

*Baccarodes holtonii* (Baker) O. Ktze., Rev. Gen. Pl. 1: 320. 1891.

*B. brachylepis* (Sch. Bip. ex Baker) O. Ktze., Rev. Gen. Pl. 1: 320. 1891.

*B. violaceum* (Schrank) O. Ktze., Rev. Gen. Pl. 1: 320. 1891.

*B. punctatum* (Cass.) O. Ktze., Rev. Gen. Pl. 1: 320. 1891.

*B. muticum* (H.B.K.) O. Ktze., Rev. Gen. Pl. 1: 320. 1891.

*Centratherum aristatum* non Cass. Index Kew. 1: 478. 1895.

*C. punctatum* Cass. var. *foliosa* Chod., Bull. Herb. Boissier 2(2): 298. 1902. TYPE: PARAGUAY: *Capibuy, Hassler 4378*. (Holotype: G! Isotype: BM! K! NY! P!).

*C. punctatum* Cass. ssp. *camporum* Hassl. var. *viscosissimum* Hassl. f. *foliosum* (Chod.) Hassl., Feddes Repert. Spec. Nov. Regni Veg. 12: 369. 1913.

*C. punctatum* Cass. ssp. *camporum* Hassl. var. *viscosissimum* Hassl. f. *brachyphyllum* Hassl. Feddes Repert. Spec. Nov. Regni Veg. 12: 369. 1913. TYPE: PARAGUAY: In regione vicine Igatimi, *Hassler 4768* (Holotype: G! Isotypes: GH! MO! MPU! NY! P! S!).

*C. punctatum* Cass. ssp. *camporum* Hassl. var. *longipes* Hassl., Feddes Repert. Spec.

Nov. Regni Veg. 12: 369. 1913. TYPE: PARAGUAY, *Fiebrig 4532* (Holotype: B, as photo GH! TEX!).

*C. violaceum* (Schrank) Gleason, N. Amer. Fl. 33: 49. 1922.

*C. camporum* (Hassl.) Malme var. *longipes* (Hassl.) Malme, Ark. Bot. 24A 6: 15. 1931.

Sprawling to erect herb becoming suffrutescent with age, stems strigose, often ridged. Leaves cauline, often crowded; short petiolate to sessile; blades ovate to elliptic to spatulate, obtuse at the apex, cuneate to attenuate at the base, (1)2-7 cm long, (0.5)0.8-3 cm wide, margins serrate, often ciliate, glandular-punctate, often pubescent (especially on veins) above and beneath. Inflorescences of terminal heads, or occasionally 2-3 headed clusters, peduncles 2-7 cm long. Heads with numerous florets; involucre cylindrical-campanulate, imbricate in several series; phyllaries glandular, membranaceous, outer foliaceous, greenish; inner phyllaries purplish, rounded to aristate (when awned, awns to 3 mm). Corollas 5-8(10) mm long, glandular. Pappus straw-colored; bristles numerous, deciduous 1.5-2.8(3.5) mm long, rarely absent. Achenes (1.2)1.6-2.6 mm long, 8-10 ribbed. Chromosome number:  $n = 16, 32$ .

This subspecies occurs in South and Central America and the West Indies. It grows in pastures and waste places, flowering the year around. It is sometimes cultivated as an ornamental.

The one specimen seen was: PERU: no locality cited, *Woytkowski 7643* (MO). The material from Peru represents *C. punctatum* Cass. ssp. *punctatum*.

## V. STRUCHIUM

*Struchium* P. Br., Civ. Nat. Hist. Jam. 312, tab. 34, fig. 2. 1756.  
TYPE: *S. herbaceum* St.-Hil.

*Athenaea* Adans. Fam. 2: 121. 1763, non Sendtn. (Solanaceae), *nom. cons.*

*Sparganophorus* Vaill. ex Crantz, Inst. 1: 261. 1766.

Erect, weedy, annual herbs, stems simple or branched, somewhat succulent. Leaves alternate, simple, petiolate, blades subentire to serrate, pinnately veined. Inflorescences axillary, of single or glomerate heads. Heads discoid; involucre hemispheric; phyllaries numerous, imbricated in several series. Corollas tubular, 3-lobed, white; style branches reddish-purple. Pappus a cartilaginous, whitish corona, ca. one-half the length of the achene. Achenes 3-4 angled.

A monotypic genus of the New World tropics that is reportedly weedy in Africa.

1. *Struchium sparganophorum* (L.) O. Ktze., Rev. Gen. Pl. 366. 1891.

*Ethulia sparganophora* L., Sp. Pl., ed. 2. 1171. 1763. TYPE: not seen.

*Struchium herbaceum* P. Br. ex St.-Hil., Expos. Fam. 1: 406. 1805.

*Sparganophorus struchium* Poir. in Lam., Encycl. Méth. 7: 302. 1806. (July). TYPE: P. Br., Civ. Nat. Hist. Jam. 312, tab. 34, fig. 2. 1756.



FIG. 7. *Struchium sparganophorum*. A, habit,  $\times \frac{1}{2}$ ; B, detail showing axillary inflorescences, natural size; C, mature head showing achenes and receptacle,  $\times 5$ ; D, mature head with fallen corollas showing top achenes,  $\times 3\frac{1}{2}$ ; E, flower at anthesis,  $\times 16$ ; F, corolla showing position of lobes and stamens,  $\times 18$ , stigma,  $\times 25$ . (From Steyermark 46308, F.)



*S. fasciatus* Poir. in Lam., Encycl. Méth. 7: 302. 1806. TYPE: Lam. Ill. Genres. tab. 670. 1823.

*Struchium americanum* Poir. in Lam., Encycl. Méth. 7: 475. 1806. TYPE: P. Br., Civ. Nat. Hist. Jam. 312, tab. 34, fig. 2. 1756.

*Ethulia struchium* Sw., Prod. Veg. Ind. Occ. 3: 1297. 1806. TYPE: P. Br., Civ. Nat. Hist. Jam. 312, tab. 34, fig. 2. 1756.

Annual **herbs**, 0.4-1 m tall, stems simple or branched, somewhat succulent, stout, sparsely short-strigose. **Leaves** cauline; petioles ca. 1 cm long; blades elliptic, acuminate at the apex, cuneate at the base, 9-12 cm long, 3-7 cm wide, margins subentire to serrate, inconspicuously strigose to glabrate on both surfaces. **Inflorescences** of solitary or glomerate heads in the leaf axils. **Heads** with 60-70 florets, sessile or on short branches; involucre hemispheric, 3-5 mm long; phyllaries arachnoid, appressed, greenish with white margins, tips acuminate. **Corollas** 2 mm long, white, 3-lobed, glabrous; style branches reddish purple. **Pappus** a cartilaginous corona. **Achenes** 2 mm long, 3- to 4-angled, glandular.

This species is distributed throughout tropical America and is reportedly adventive in Africa. It grows in moist alluvial or sandy soil along streams or in flood plains. Flowering and fruiting occur throughout the year.

LORETO: Pongo de Manseriche, *Mexia* 6350 (MO, UC, US). SAN MARTIN: Tocache Nuevo, *Vigo* 7144 (MO).

## VI. ELEPHANTOPUS

**Elephantopus** L., Sp. Pl. 814. 1753. TYPE: *Elephantopus scaber* L.

*Orthopappus* Gleason, Bull. New York Bot. Gard. 4: 237. 1906. TYPE: *Elephantopus angustifolius* Sw.

Erect perennial **herbs**, simple or sparsely branched; stems usually solitary and pubescent. **Leaves** cauline or chiefly basal; petioles usually indistinct; blades elliptic to lanceolate or ovate, acute at the apex, attenuate at the base, margins entire to crenate or dentate. **Inflorescences** spicate, corymbose, or slightly paniculate; bracteate; the heads in ovoid or globose glomerules, the glomerules dense with many heads. **Heads** with (1)2-4(5) florets; involucre of 8 phyllaries, in 4 decussate pairs. **Corollas** blue to white, tubes slender, the limb unequally 5-cleft with a deeper fissure on the inner side. Chromosome number:  $n = 11, 22$ .

*Elephantopus* is a largely tropical genus of ca. 30 species centered in the New World but also occurring in the Old World tropics.

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- CLONTS, J. A. 1972. A revision of the genus *Elephantopus*, including *Orthopappus* and *Pseudelephantopus* (Compositae). Unpublished Ph.D. dissertation, Miss. State Univ.
- CLONTS, J. A. AND S. MCDANIEL. 1978. *Elephantopus*. N. Amer. Fl. Ser. II, pt. 10, pp. 196-202.

KEY TO SPECIES OF *Elephantopus*

- a. Inflorescence paniculate, glomerules pedunculate; pappus bristles 5-8 ..... 1. *E. mollis*.  
 aa. Inflorescence appearing spicate, glomerules sessile, pappus bristles numerous (ca. 20-30) ..... 2. *E. angustifolius*.

1. ***Elephantopus mollis*** H.B.K., Nov. Gen. & Sp. 4: 26. 1820. TYPE: Caracas, Caracas, *Humboldt and Bonpland 627* (Holotype P, as IDC microfiche!).

*E. martii* Grah., Edinburgh New Philos. J. Jan.-Mar. 378. 1830. TYPE: Brazil: Rio Janeiro, *Harris s.n.* (not seen).

*E. sericeus* Grah., Edinburgh New Philos. J. Jan.-Mar. 373. 1831. TYPE: Dominica: *Krous s.n.* (not seen).

*E. serratus* Blanco, Fl. Filip. ed 1. 635. 1837.

*E. carolinanus* var. *mollis* (H.B.K.) Beurl., Bidr. Portobellensis F. 134. 1854.

*E. hypomalacus* Blake, Contr. Gray Herb. 52: 20. 1917. TYPE: Costa Rica, *Holway 314* (Holotype GH).

*E. pilosus* Philipson, J. Bot. 77: 314. 1939. TYPE: Dutch Guiana: *Hostmann 875* (Holotype BM, Isotype K).

Erect perennial herbs, 3-10(20) cm tall, from a creeping rootstock, stems pilose or hirsute. Leaves cauline or basal, greatly reduced upward; petioles short and clasping the stem; blades ovate, obovate, or oblanceolate, acute to short acuminate at the apex, attenuate to the base, 8-20 cm long, 5-10 cm wide, margins crenate, serrate to subentire, thinly pilose to slightly scabrous above, softly pilose beneath. Inflorescences corymbose-paniculate, glomerules terminal, to 2.3 cm wide; bracts 3, cordate to deltoid, 0.7-1 cm wide, 0.7-1.3 cm long, occasionally longer or shorter than the glomerules, acute to short acuminate, pilose. Heads with 4 florets; phyllaries lanceolate, 1.5-2 mm wide, 6-8 mm long, sharply acuminate, membranous along the margin, at least below, sparsely pubescent, at least above the middle. Corollas 5-6 mm long, white to bluish pink, deeply divided on the adaxial side. Pappus of 5(8) bristles uniseriate, ca. 4 mm long dilated into a narrow to broad triangular base. Achenes 2.5-3.5 mm long, ribbed minutely pubescent. Chromosome number:  $n = 11$ .

This species is widely distributed in the American tropics and has been introduced into tropical Africa and southeast Asia. Flowering and fruiting occur throughout the year.

AMAZONAS: Mendoza, *Woytkowski 8111* (MO). LORETO: Lago Llanachama near Rio Nanay, *Croat 18756* (MISSA, MO). SAN MARTIN: Jepelacio near Moyobamba, *Klug 3464* (F, MO, US). HUANUCO: Tingo María, *Asplund 12155* (US). JUNIN: near La Merced, *Killip and Smith 23972* (US). AYACUCHO: La Mar: Between Ayna and Hacienda Luisiana, *Dudley 11686* (USM). CUZCO: Machupicchu, *Vargas 806* (F, USM). MADRE DE DIOS: ca. 20 km W of Puerto Maldonado, *Gentry, Revilla, Alfaro, Daly 19677* (MO).



FIG. 8. *Elephantopus mollis*. A, habit,  $\times \frac{1}{2}$ ; B, inflorescence,  $\times 2$ ; C, flowering head with detail,  $\times 3$ ; D, corollas, one dissected to show detail,  $\times 13$ ; E, anther,  $\times 25$ . (From Standley 76193, F.)



2. **Elephantopus angustifolius** Sw., Prod. Veg. Ind. Occ. Prodr. 115. 1788. Based on Sloane, Voy. Isl. Madera. 1: 256, pl. 148, fig. 4. 1707.

*E. nudiflorus* Willd. Sp. Pl. 3: 2390. 1804. TYPE: St. Domingo, *Poiteau* (not seen).

*Elephantosis quadriflora* Less., Linnaea 4: 323. 1829. TYPE: Brazil, *Beyrich s.n.* (not seen).

*Elephantopus quadriflorus* (Less.) D. Dietr., Syn. Pl. 4: 1372. 1847.

*Orthopappus angustifolius* (Sw.) Gleason, Bull. New York Bot. Gard. 4:237. 1906.

Perennial erect herbs arising from a short caudex, usually 3-12(15) dm tall, stems pilose. Leaves cauline and basal, crowded near the base; petioles short and broad; blades narrowly oblanceolate to oblong-lanceolate or linear to oblong, acute to obtuse at the apex, long attenuate at the base, (5)10-35(50) cm long, 1.3-4(5.5) cm wide, margins shallowly and irregularly crenate, thinly and softly strigose on both surfaces, the trichomes somewhat silvery beneath. Inflorescences spicate or racemose-spicate below, glomerules lateral and terminal, to 2 cm wide, bracts 1 or 2, lanceolate, to 1 cm long. Heads with 4 florets; phyllaries 8, in 2 descussate series, acute to acuminate, membranous along the margin, sparsely strigose at least above the middle. Corolla tubes to 6 mm long, the limb 2 mm long, white to lavender, 5 parted, deeply divided on the adaxial side. Pappus of 20-40 bristles, uniseriate, 6-7 mm long, gradually dilated near the base. Achenes 1.5-2.5 mm long, ribbed, pubescent. Chromosome number:  $n = 11$ .

This species is distributed from southern Mexico south to northern Argentina and Chile and into the West Indies. Flowering and fruiting occur throughout the year.

AMAZONAS: 4 km from Campamento Ingenio, *Hutchison and Wright 3980* (F, MO, US). LORETO: Yurimaguas, *McDaniel and Rimachi Y 16554* (MISSA, F, MO). SAN MARTIN: Tarapoto, *McDaniel 13724* (F, MO, MISSA). HUANUCO: Pachitea, Camino a Shahuinto a 5 km del campamento de Iparia, *Schunke 1667* (F). JUNIN: San Ramon, *Woytkowski 7487* (MO, US). CUZCO: *Herrera 3232* (F).

## VII. PSEUDELEPHANTOPUS

**Pseudelephantopus** Rohr, Skr. Naturhist.-Selsk. 2: 213. 1792. "PseudoElephantopus," TYPE: *Elephantopus spicatus* Juss. ex Aubl.

*Distreptus* Cass., Bull. Soc. Philom. Paris 1817: 66. 1817. TYPE: *Elephantopus spicatus* Juss.

*Matamoria* La Llave & Lex., Nov. Veg. Desc. fasc. 1: 8. 1824. TYPE: *Elephantopus spicata* Juss. ex Aubl.

*Spirochaeta* Turcz., Bull. Soc. Imp. Naturalistes Moscou 24: 166. 1851. TYPE: *S. funckii* Turcz.

*Chaetospira* Blake, J. Wash. Acad. Sci. 25: 311. 1935. TYPE: *Spirochaeta funckii* Turcz.

Erect **herbs**, stems solitary, branched. **Leaves** cauline, clasping, alternate, pinnately veined; petioles indistinct. **Inflorescences** terminal, slender, racemose-spicate, in glomerules of 1-5 heads usually subtended by 2 foliaceous bracts. **Heads** with 4 florets; involucre of 8 phyllaries. **Corollas** tubular-funnelform, the tube slender, the limb 5-cleft, deeply divided on one side; anthers sagittate at the base; style slender. **Pappus** of 5-15 unequal or subequal bristles, uniseriate, plicate or spiraled at the tip, some straight bristles in 1 species. **Achenes** 10-ribbed.

A neotropical genus of two species, both known from Peru; introduced pantropically.

Cronquist (1971) discusses the spelling of *Pseudelephantopus* and maintains it as a genus. It was recognized as a genus by Busey (1975); however, Clonts (1972) submerged it in *Elephantopus*. The two genera *Pseudelephantopus* and *Elephantopus* differ in gross morphology of the inflorescence and in other features. *Pseudelephantopus* differs cytologically having a chromosome number of  $n = 13$ ; *Elephantopus* has  $n = 11, 22$ . Because of the cytological differences and its specialized morphology, it clearly merits generic status.

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- CRONQUIST, A. 1971. Composite. In I. L. Wiggins and D. M. Porter, Flora of the Galapagos. pp. 350-353. Stanford Univ. Press, Stanford.
- GLEASON, H. A. 1922. *Pseudelephantopus*, N. Amer. Fl. 33, p. 109.

### KEY TO SPECIES OF *Pseudelephantopus*

- a. Pappus consisting of 2 bristles bent and curled and several short straight bristles . . . . . 1. *P. spicatus*.  
 aa. Pappus bristles curled or twisted . . . . . 2. *P. spiralis*.

1. ***Pseudelephantopus spicatus*** (Juss. ex Aubl.) C. F. Baker, Trans. Acad. Sci. St. Louis 12: 55. 1902. Based on Sloane, Voy. Isl. Madera 1: 256, pl. 150, fig. 3-4. 1707.

*Elephantopus spicatus* Juss. ex Aubl. Pl. Gui. 2: 808. 1775.

*Distreptus spicatus* (Juss. ex Aubl.) Cass., Dict. Sc. Nat. 13: 667. 1819.

*Matamoria spicata* (Juss. ex Aubl.) La Llave & Lex., Nov. Veg. Desc. fasc. 1: 8. 1824.

Erect perennial **herb** up to 1 m tall, stems pilose or hirsute, striate. **Leaves** cauline; petioles indistinct; blades lanceolate, oblanceolate, obovate, reduced above, acute at the apex, attenuate, clasping at the base, (3)4-10(17) cm long, 1-5 cm wide, margins remotely serrate to sinuate, hispid above, pilose to hirsute and punctate beneath. **Inflorescences** racemose-spicate; clusters of heads sessile, lateral and terminal, 3-5 headed. **Heads** with 4 florets; phyllaries 8, similar, in 4 pairs, lanceolate, keeled, 9-12 mm long, 1.5-2(3)



FIG. 9. *Pseudelephantopus spiralis*. A, habit; B, head; C, achene. (From Dillon & Turner 1421, F.)



mm wide, sparsely pubescent at apex, tips sharply acuminate. **Corollas** 6-10 mm long, white to blue-purple. **Pappus** of 4-10 bristles, 2-seriate, 2-plicate, 5-7 mm long, the remainder straight and shorter, gradually dilated at the base. **Achenes** 5-7 mm long, ribbed, pubescent. Chromosome number:  $n = 13$ .

This species is distributed from Central Mexico and the West Indies south to Chile, and has become a pantropical weed. Flowering and fruiting occur throughout the year.

**SAN MARTIN:** San Martín: Tarapoto Hills, *Plowman 6026* (USM). **LORETO:** Coronel Portillo: cerca a Neshuya, *Ferreyra 17193* (USM). **JUNIN:** Tarma: La Merced, Chanchamayo, *Ferreyra 0490* (USM).

## 2. *Pseudelephantopus spiralis* (Less.) Cronq., *Madroño* 20: 255. 1970.

*Distreptus spiralis* Less. *Linnaea* 6: 690. 1831. TYPE: Jamaica, *Herb. Thunberg 20920* (UPS).

*Spirochaeta funckii* Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 24: 167. 1851. TYPE: Venezuela, LaGuayra, *Funck 358*, Galeotii *Herb.* 380 (G-Delessert *Herb.* 28530).

*Chaetospira funckii* (Turcz.) Balke, *J. Wash. Acad. Sci.* 25: 311. 1935.

*Pseudelephantopus funckii* (Turcz.) Philipson, *J. Bot.* 76: 301. 1938.

*Chaetospira spiralis* (Less.) Aspl. & Blake, *Svensk Bot. Tidskr.*, 52: 50. 1958.

Erect, perennial, stoloniferous **herb**, stems pilose to hirsute. **Leaves** cauline; petioles indistinct; blades oblanceolate to obovate, acute to obtuse at the apex, attenuate at the base, 3-7(15) cm long, 1.2-3(5) cm wide, margins crenate, hispid above, punctate and hispid beneath. **Inflorescences** racemose-spicate, bracteate, clusters of heads subsessile, 5-10 headed. **Heads** with 4 florets; phyllaries 8, similar, in 4 pairs, oblong-lanceolate, keeled, 7-8 mm long, 1-2 mm wide, pubescent above middle, tips acuminate. **Corollas** 6-7 mm long, whitish to blue-purple. **Pappus** of 4-6 bristles, uniseriate, 4-6 mm long, strongly twisted above the middle, dilated at the base. **Achenes** 2.5-3 mm long, ribbed, pubescent.

This species is distributed from Costa Rica and the Lesser Antilles throughout northern South America south to northern Argentina and occurs as a weed in pastures and waste places. Flowering and fruiting occur throughout the year.

**SAN MARTIN:** San Martín: cerca a Tarapoto, *Ferreyra 17863* (USM). **LORETO:** Mishuyacu, *Klug 1331* (F). **MADRE DE DIOS:** Iberia, *Seibert 1928* (US, USM). **MAYNAS:** Bellavista, *McDaniel 16052* (MISSA, MO). **JUNIN:** Rio Pinedo, N of La Merced, *Killip and Smith 23596* (F).

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Figures 7 and 8 were drawn by Marion Pahl and are used with the permission of the Editor of *Fieldiana*. The remaining figures were drawn by Marlene Werner, Department of Exhibition, Field Museum of Natural History.

## INDEX OF LATIN NAMES

Names in **boldface** refer to new species; names in Roman type refer to valid species; names in *italics* refer to synonyms. Numbers in **boldface** refer to descriptions; numbers in *italics* refer to illustrations.

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